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Telephony.

VOLUME VII.
NUMBER 2.

AN ILLUSTRATED MONTHLY TELEPHONE JOURNAL

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CHICAGO, FEBRUARY, 1904.

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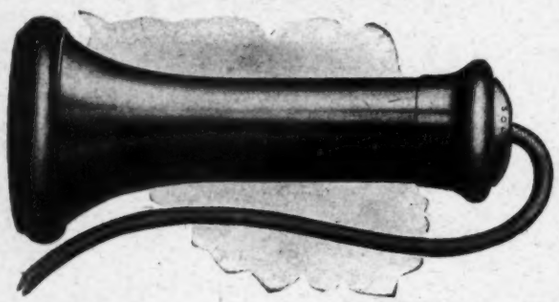

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Alphabetical Index to Advertisers

A. P. Hopkins & Co. 94
Acme Electric Co. 18
American Conduit Co. 98
American Electric Fuse Co. 16-17
American Elec. Tele. Co. ..27-100
American Miniature & Decorative Lamp Co. 18
American Electric Works 100
Anderson & Sons, W. H. 28
Andrae Sons Co., The Julius .. 22
Austin, M. B. & Co. 1
Automatic Electric Company .. 9

Baird Mfg Co. 35
Barrarm 28
Beidler & Co., Francis 94
Benedict & Burnham B. & C. Co. 96
B.-R. Elec. & Telo. Mfg. Co. .. 99
Bowersock, Fred H. 50
Brooks, Hall L. 92
Butterfield, J. F. 100

Camp Co., H. B. 97
Carney Bros. Co. 86
Central Telo. & Electric Co. 4
Chicago Fuse Wire & Manufacturing Co. 8
Chicago Telo. Supply Co. ..1-3-5
Chicago Insulated Wire Co. .100
Chicago Writing Machine Co. 13
Clark Wireless T.-T. Co., Thos. E. 20
Clement, E. E. 50
Commercial Elec. Supply Co 26
Conover, Geo. W. 100
Controllaphone 11
Cook, F. B. 29
Coolidge Co., Marshall H. 89
Corn Exchange National Bank 84
Country Home Tel. Mfg. Co. 7
Crowe Metal Mfg. Co. 1
Crumb & Co., W. H. 100

Dearborn Electric Co. 1
Deavitt, H. M. 1
Doubleday-Hill Electric Co. .. 20

Eccleston Lumber Co. 94
Electric Appliance Co. 6
Eureka Electric Co. 48
Ewing-Merkle Electric Co. 12

Fahnestock Transmitter Co. . 20
Faller Automatic Tel. Ex. Co. 83
Farr Telephone & Construction Supply Co. 10
Field, C. J. 2
Fowler, John H. 86

Garton-Daniels Company 1
General Engineering Co. 1
Greenbrier Pole Co. 93
Guarantee Telo. & Equipment Co. 22

Hallett Iron Works 8
Helios-Upton Co., Receivers ... 12
Hemingray Glass Co. 14
Hipwell Manufacturing Co. 35
Holt Lumber Co. 85
Hubbs-Neer Elec. Co. 100

Illinois Electric Co. 7
Imperial Finance & Const. Co. 100
Indiana Rubber & Ins. Wire Co. 2
Indiana Steel & Wire Co. 93
International Creosoting & Construction Co. 89
International Telephone Manufacturing Co. 25

Jones & Winter 1

Kellogg Switchboard & Supply Co. 46-47-93
Kester Electric Mfg. Co. 50
Keystone Elect. Telephone Co. 100
Klein & Sons, Mathias 1
Klipstein & Co., A. 100
Kokomo Telo. & Elec. Mfg. Co. 4

Lindsley Bros. Co. 97

Maltby Lumber Co. 87
McOuat, Robt. L. 99
McRoy Clay Works 1
Miller Anchor Co. 22
Monarch Telephone Mfg. Co. 31
Moon Manufacturing Co. 14
Mountain State Electrical Co. 30
Mueller Company, Wm. 84

Nash & Co., Geo. 50
National-Acme Mfg. Co. 26
National Tel. Supply Co. 2
Naugle Tie Co., E. E. 91
New Haven Novelty Machine Co. 30
N. Y. Insulated Wire Co. 1
North Electric Co. 32-33
Norstrom Lock-out Telo. Mfg. Co. 24

Okonite Co., Ltd., The 96

Pendleton & Gilkey 92
Pittsburg & Lake Superior Iron Co. 85
Plew, James E. 96
Plume & Atwood 99
Pontiac Engraving Co. 98

Raber & Watson 88
Reynolds, W. T. 95
Roebling & Sons Co., John A. 97
Rogers, Oscar Wentworth 36-37-38-39-40-41-42-43-44-45

Sand Point Cedar Co. 90
Scoville Manufacturing Co. ... 99
Standard Telo. & Electric Co. 23
Standard Underg'd Cable Co. .. 50
Stanton, L. W. 100
Sterling Electric Co. 49
Sterling & Son, W. C. 87
Stevens Co., Charles G. 1
Stromberg-Carlson Telephone Manufacturing Co. 34
Swedish-American Tele. Co. ... 21

Taylor, Lee J. 94
Telephone Books 50-100
Torry Cedar Co. 88

Valentine-Clark Co. 96
Veeder Mfg. Co. 28
Victor Telephone Works 100
Vought-Berger Co. 15

Want Advertisements 97
Warner Electric Co. 24
Waterbury & Co. 99
Wesco Supply Co. 50
Western Telephone Mfg. Co. . 19
White Pine Lumber Co. 90
Williams-Abbott Elec. Co. 10
Wittenberg Cedar Co. 95
Worcester Co., C. H. 91
W. G. Nagel Elec. Co. 1-28
W. J. Murdock & Co. 2

Yonkers Specialty Company .. 12

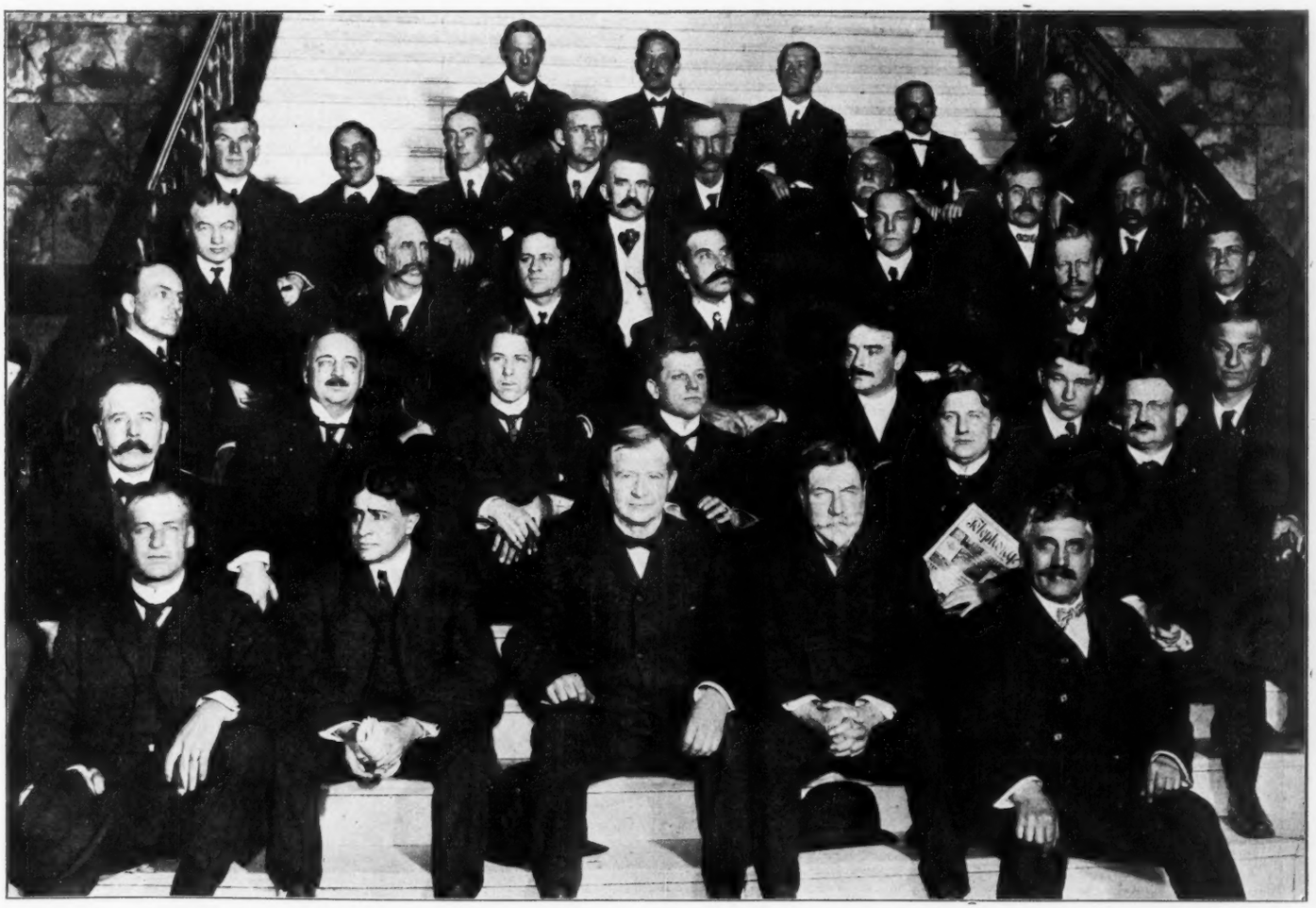
Telephony.

AN ILLUSTRATED MONTHLY TELEPHONE JOURNAL

VOL. VII. CHICAGO, FEBRUARY, 1904. No. 2.

Eighth Annual Convention Northwestern Cedarmen's Association

The eighth annual meeting of the Northwestern Cedarmen's Association was held in the Auditorium Hotel, Chicago, Tuesday afternoon, January 5. It was an eventful meeting, inasmuch as it was the first one ever held in Chicago, and the second one ever held away from the cedar-producing regions of the north. The last annual meeting was held in Minneapolis and the Chicago members thought it proper that this year it should be held in their city.



NORTHWESTERN CEDARMEN'S ASSOCIATION CONVENTION, AUDITORIUM HOTEL, CHICAGO, JANUARY 5, 1904.

The meeting was called to order by Treasurer Reade. M. K. Bissell of Escanaba, Mich., was chosen chairman and the routine business of the meeting was proceeded with. The minutes of the last annual meeting, held in Minneapolis, January 12, 1903, were read by Secretary Fred H. Gilman and approved.

The secretary also read the annual address of President R. H. Downing, who could not be present on account of illness, which was as follows:

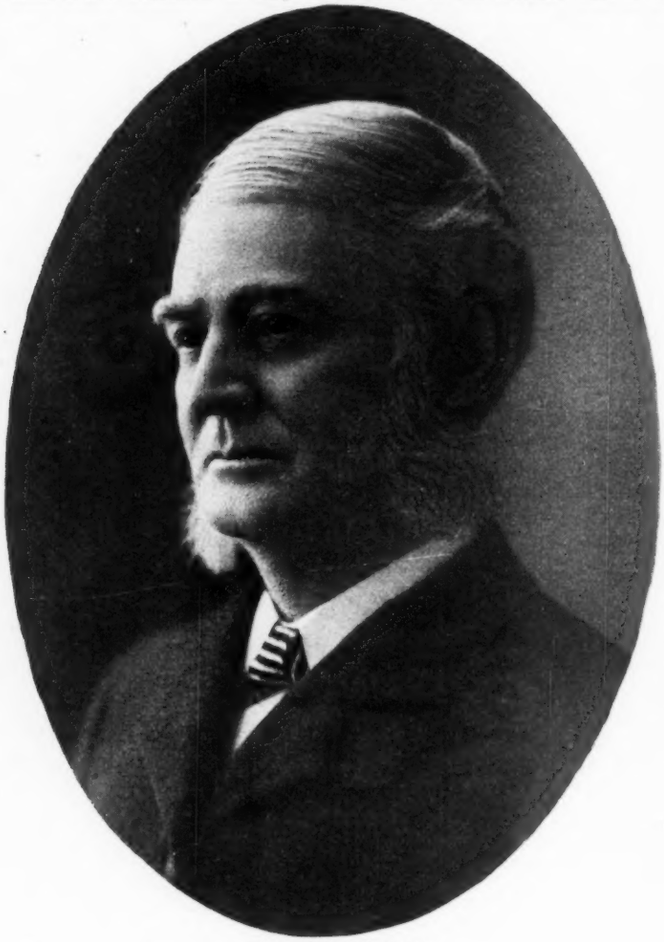
THE PRESIDENT'S ADDRESS.

Gentlemen: The second number of the proceedings calls for the president's annual address. The constitution and by-laws does not

state upon what subject he is expected to enlighten your benighted minds, and I take it he would be at liberty to talk to you on politics, religion or morality. For politics I never have had any taste or inclination. To make an address to the average cedarman on religious matters would, I fear, be fulfilling the scripture adage of casting pearls before swine. As for morality, it is safe to venture the opinion that with perhaps one or two exceptions, this is as highly moral a body of men as ever congregated under one roof in the city of Chicago. It would seem best therefore for me to confine what few remarks I have to make to the cedar business and this association, and endeavor if possible to have you appreciate more fully than I think you do what benefit it has been to you in the past and what its possibilities may be in the future. To fully comprehend the benefits we have derived from the association we should first consider what can such an association be expected to accomplish. For what purpose was it organized? What are its objects? The first paragraph of your constitution and by-laws reads as follows:

"The title of this organization shall be the Northwestern Cedarmen's Association, and its object shall be to secure a full understanding of the conditions surrounding the white cedar market in the territory covered by this association; the establishment of weights and rules uniform for the inspection of cedar as a legitimate basis for more nearly uniform prices, and to propose and carry out such other measures as may be deemed for the welfare and in the interest of wholesale dealers in and manufacturers of white cedar, members of this association."

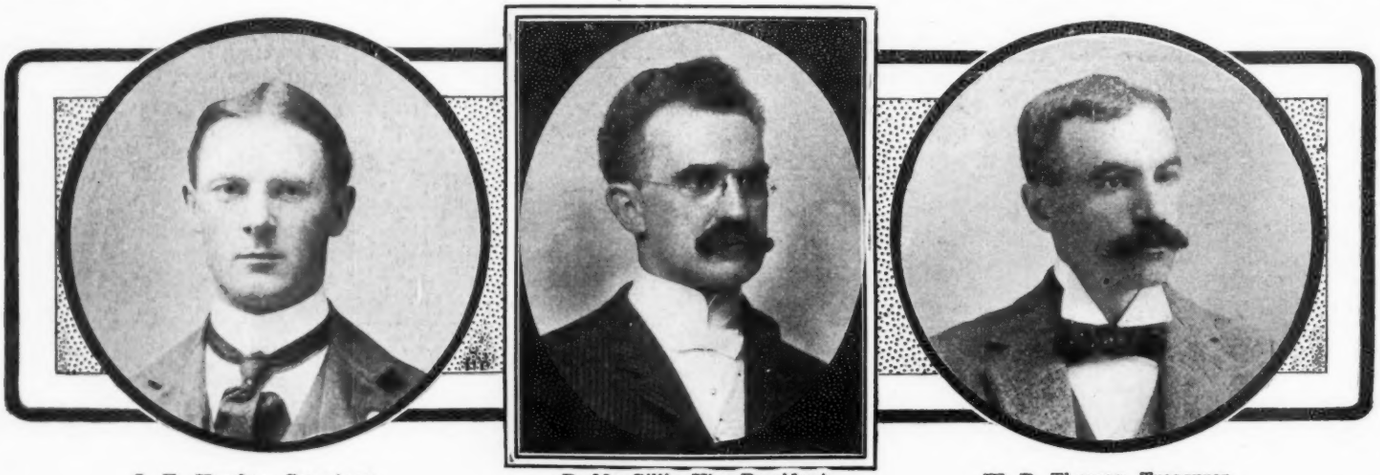
H. W. READE, PRESIDENT.



E. H. VALENTINE.

This covers the whole ground—"secure a full understanding of the conditions surrounding the market as a legitimate basis for more nearly uniform prices," and give the information to the members, so they can profit by it. This is all it can be expected to do. It simply proposes to collect or secure information for you and place it before you in such shape that it will enable you to know what you should obtain for your product.

When the association was first organized and manufacturers and



J. F. Hayden, Secretary.

D. MacGillis, Vice-President.

W. B. Thomas, Treasurer.

ATTENDANTS NORTHWESTERN CEDARMAN ASSOCIATION CONVENTION.

W. P. Bowring. Hall L. Brooks. M. H. Cooledge.
M. B. Cross. J. H. Fowler. D. M. Fulmer. J. W. Fulmer.
J. Jeffrey. E. E. Kaufman. F. J. Lang. G. L. Lindsley.

dealers began to take some interest in it, the white cedar industry was in a rather chaotic condition. There was no uniformity in prices or weights, no specifications as to quality or kind; each man was a law unto himself and wanted to be to his competitor. All this has been changed. The delivered lists based on shipment from one central point equalize all prices; the rate classification books issued by the association, from a financial standpoint, are alone worth all it costs any of you for membership and dues. The price lists are compiled by committee who are or should be experts in their line and in closest touch with the market; and although I have heard expressions of opinion to the contrary, I believe no list has ever been issued that was not an honest opinion of the committee as to the values that could be obtained at the time. This is all the association promises to do for you, and none of you can truthfully say it has not fulfilled its promises. It has done more. The past three years have been years of quickly shifting values, prices of all commodities have advanced without concerted action by the association. None of us would have obtained what we did for our material, and no doubt some of us would be selling at 1893, under the same law that Kentuckians still vote for Jackson. So much for what it has done.

What are its possibilities? What benefits can you expect from it in the future? I have stated that values have been advanced for the past three years; unfortunately this is not exactly correct. Like most all other commodities, that in which you deal has taken a decline in the past six months. As you have always obtained better results by united action in securing any advance the market justifies, it is common sense to assume that united action would more quickly stop an unwarranted decline. With the country in excellent financial condition, with the water squeezed out of a large number of over-capitalized industrial concerns and inflated values of stocks and commodities and prospects getting better every day for a year of good business, why should we not by united action now make a strong effort to hold prices steady for a product that has never had an inflated value? For good as the prices may seem that you have been getting the past two or three years, there is no other forest product that does not bring a higher average price per car load than white cedar.

As a rule associations of this kind flourish and prosper when prices are advancing, and correspondingly decline and weaken in usefulness and efficiency on a falling market. I sincerely hope ours will prove one of the exceptions to the rule, and it will if you give it the support financially and otherwise to which it is justly entitled for the good it has done.

Your committee will no doubt revise the present list and make it conform more nearly to what is now being obtained from the trade. In starting the new year's business, why not make a united effort to get the prices adopted and when you make a quotation stand by it and not let the buyer and commission man fix the price for you, as they have been doing for the past six months?

My remarks are chiefly for those who handle posts and shingles, but they apply with equal force to members engaged in the pole business. To them I would say, do not believe you can fool your competitor by talking high price and good demand to him when you meet him and then cut the life out of the first contract you get a chance to bid on; he is doing the same thing. Get together, agree on a reasonable price and stand by it; there is going to be business enough for you all.

I would request of my successor to be careful in the selection of committees. The best men we have should be appointed on them and they should meet often, and it seems to me it would be a good plan for the association to have a general meeting in April or May, after the winter's operations are completed, to discuss prevailing conditions and make any changes in the list that might be desirable.

The secretary has tried for several years without any success to get a statement from all the members of the stocks produced and on hand. I can see but two reasons why he has been unable to procure this information. Either we do not know enough about the details of our business to make up such a statement or we are such a suspicious lot we fear the other fellow will get some information about what we are doing. If such a statement could be procured covering the production and stocks on hand of posts, poles and white cedar shingles, the lumber journals, I presume, would be glad to publish it as they do lumber statistics. It would no doubt prove an excellent advertising medium for those carrying large stocks, as these statistics are scanned closely by retail dealers. If it is thought best for the secretary to again try and get the information together, we can take it up at the proper time, but we must have united action or nothing will be accomplished.

In retiring from the presidency, let me say if I have given offense to any member by word or deed, it has not been done intentionally. I have nothing but the kindliest feelings for you all and wish you the fullest measure of prosperity heaped up and running over.

The president's address was received with applause. The next thing on the program was the annual report of the secretary, which was as follows:

THE SECRETARY'S REPORT.

It is unfortunate that we have not with us to-day our president, who a few days ago confidently expected to be present, but he has sent his annual address, which gives his views on the trade situation and on the work of the association much better than I can attempt to do.

The past year has been a fairly good one for our members, but not as prosperous a year as some of its predecessors. There has nothing occurred, however, during the year that has warranted calling a special meeting of the association, and there have not been any changes made in the recommended price list since May 10 last. How well the prices have been maintained you who are engaged in selling the trade know.

The shingle situation is not satisfactory, nor has it been for some months, due as much to the demoralized condition of the Pacific coast red cedar shingle trade as anything else. There is a prospect of the producers of red cedar shingles in the state of Washington, who manufacture probably more than half of the shingles used in the United States, getting together this year and establishing prices on a permanent and somewhat higher basis than prevailed the past year. Efforts in this direction are now under way, and in a few days the result will be known. The Washington shingle manufacturers propose to put their 6 to 2 shingles into Chicago at $2.65 and maintain that price, which, if done, will enable our members who manufacture shingles to obtain a little better price than heretofore.

During the past year our association has held its own as far as membership is concerned. We have lost some members by firms going out of business and have gained some others, so that we have a membership of seventy-three in seven states, mostly, however, in Illinois, Wisconsin, Michigan and Minnesota. Since our annual meeting a year ago we have lost six members, as follows: Humbird Lumber Company, Sand Point, Ida.; Holcomb-Lobb Company, Chicago, Ill.; A. D. Day & Co., Engadine, Mich.; C. Harter & Son, Pembina, Mich.; Ross Bros. & Co., Spaulding, Mich.; Parkinson Cedar Company, Madison, Wis.

We have gained six new members—viz.: Maltby Lumber Company, Bay City, Mich.; R. Connor Company, Marshfield, Wis.; John R. Davis Lumber Company, Phillips, Wis.; Page & Hill Company, Minneapolis, Minn.; Bay du Noquette Company, Nahama, Mich., and L. H. Roberts, Paton, Iowa.

We have had several applications for membership from jobbers who put in stock in the woods and sell it in bulk to our members. Owing to the change made in our eligibilty clause two years ago it has not been possible to admit to membership such concerns, as our organization, as generally interpreted, is a selling organization.

We have had a great deal of correspondence during the past year with handlers and large users of cedar products all over the United States and many applications for our rules of inspection and tables of weights, showing that our association is being universally recognized as authority on white cedar products. There has been a noticeable increase in applications for matter of this sort, which I believe is a good indication and one that bespeaks for our association a standing in the trade.

Our association might accomplish more if it were possible to devise some way of compelling members to maintain prices, but this is not possible or practical in an organization such as this. By having a recommended list and keeping members in touch with the situation, together with meeting once or twice a year, our association accomplishes a great deal of good, but beyond this we can not very well go. If it were possible to gather tabulated statistics showing amounts of stock on hand at the different seasons of the year our association could be made more valuable to its members, and that some effort be made in this direction I would recommend.

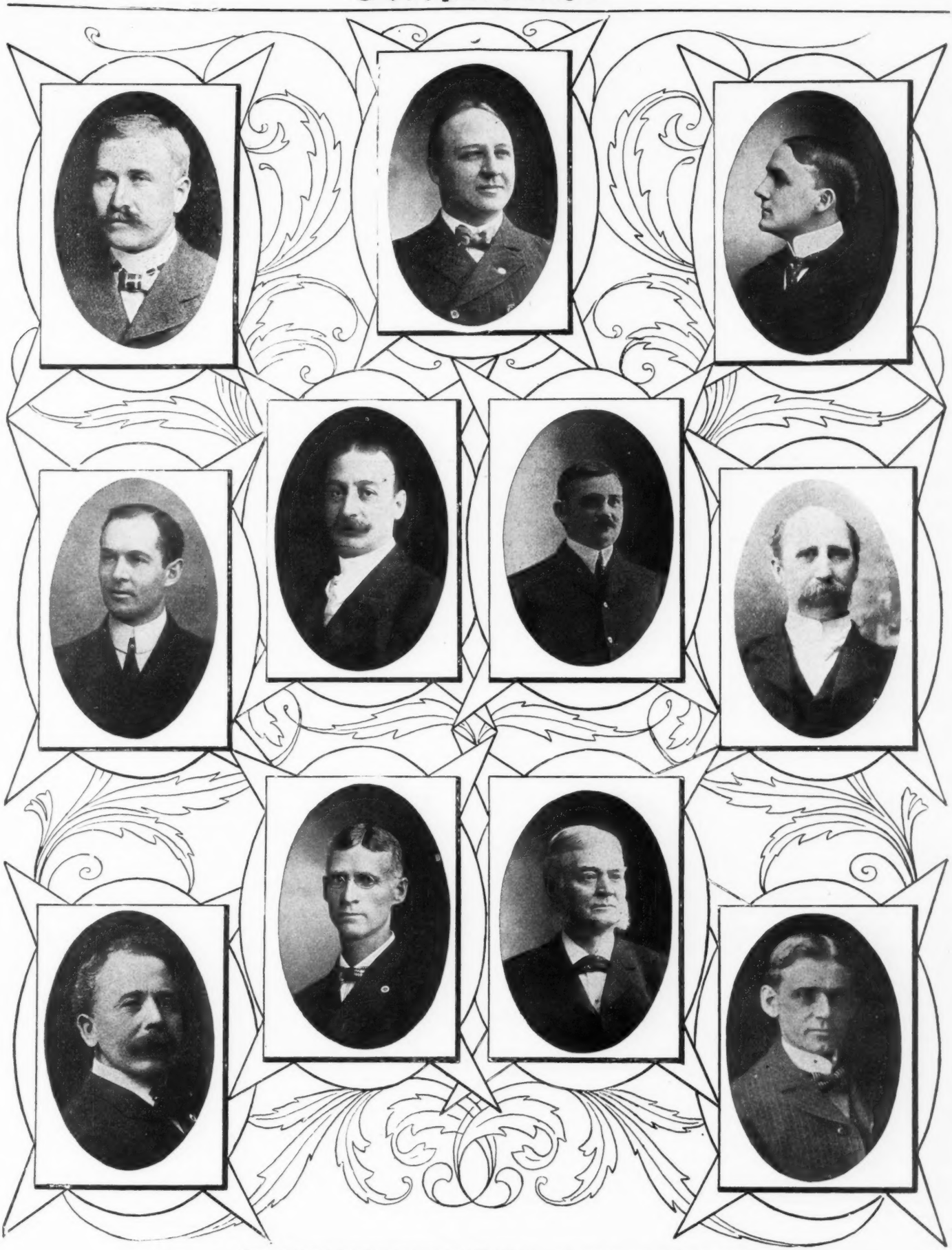
The getting out of freight classification books each year, while expensive, has been found to be of great help to members. During the past year some changes were made in the tariff, so that our books could be relied upon during the latter part of the year. As the cost of issuing new books is quite large, it might be well in the future to issue supplements as changes in rates are made and in this way members can keep their books corrected to date.

On June 12 last our board of directors took favorable action regarding the adoption of the terms of the National Lumber Manufacturers' Association, of which you were all advised at that time. These terms are now, I believe, being quite generally adhered to by our members in the sale of posts and shingles to the yard trade. This movement puts our association in line with all of the wholesale lumber associations of the country.

In closing I would thank the members for their kind assistance to the secretary during the past year.

Treasurer H. W. Reade presented his annual report as follows:

Balance on hand Jan. 13, 1903	$ 78.26
Receipts from fees and dues	680.00
Received from sale of printed matter	21.50
Total receipts	$779.76
Total disbursements	768.70
Balance on hand Jan. 5, 1904	$ 11.06



ATTENDANTS NORTHWESTERN CEDARMAN ASSOCIATION CONVENTION.

J. A. McDavitt.
J. A. Navarre.
F. N. Snell.
William Mueller.
P. W. Raber.
W. W. Townsend.
H. W. Reade.
E. H. Valentine.
A. T. Naugle.
L. H. Roberts.
C. H. Worcester.

NEW OFFICERS ELECTED.

No miscellaneous business appearing, the chair presented the election of officers and directors as the next thing in order. He said it had been customary for the chair to appoint a nominating committee, and he would assume that that was the proper manner. He appointed as the committee C. H. Worcester, A. P. Hopkins, E. H. Valentine, Geo. Nicholson, Jr., J. K. Wright.

After a short recess the committee brought in the following list as the officers and directors recommended for the ensuing year:

President—H. W. Reade, Escanaba.

Vice-President—Dan'l MacGillis, Milwaukee.

Directors—E. H. Valentine, Chicago; O. Erickson, Escanaba; W. H. Coolidge, Minneapolis; F. W. Robinson, Gould City, Mich.

On separate motions the secretary was instructed to cast the ballot of the convention for each of the candidates presented by the committee and they were declared elected.

The report of the committee was adopted and the officers declared elected. Chairman Bissell then called the newly elected president to the chair, which he took with the dignity of an old presiding officer. He refused, however, to make a speech, although repeatedly called upon. Vice-President MacGillis was also called upon repeatedly for an address, but he declined to show how good a speaker he is, declaring that he had talked enough during the meeting.

G. L. Lindsley invited the members present to attend a dinner at 6:30 p. m., as the guests of the Chicago wholesalers and others. A vote of thanks to the retiring officers was passed, after which the convention adjourned.

DIRECTORS' MEETING.

A meeting of the newly elected board of directors followed, at which the resignation of Fred H. Gilman, who has been secretary of the association for the past three years, was presented and accepeted. Mr. Gilman gave as his reason for resigning that he expected to be absent most of the time the coming year on the Pacific coast and would not be able to attend to the duties of the office. John F. Hayden of Minneapolis was elected secretary and W. B. Thomas of Manistique, Mich., was elected treasurer for the ensuing year. The secretary was instructed to issue a supplement to the freight classification books, correcting them to date.

THE BANQUET.

At seven o'clock in the evening the members of the convention sat down at a beautifully arranged table in the dining-room of the Union League Club, as the guests of the Chicago members of the association and the Chicago press. Following were the hosts:

Lindsley Bros. Company, C. H. Worcester Company, Valentine-Clark Company, Wm. Mueller Company, Francis Beidler & Company, Fulmer, Kuester, Schroeder Company, Carney Bros. Company, Raber & Watson, E. E. Naugle Tie Company, Fowler-Jacobs Company, Edward Hines Lumber Company, Perley Lowe, American Lumberman, Western Electrician, TELEPHONY.

There were no set toasts or speeches, and while Mr. E. H. Valentine, at the request of his Chicago confreres, consented to preside, he asked to have it understood that it was not in the position of toastmaster and that the occasion was a "free for all," all present being eligible to entry in the matter of talking—as well as eating and drinking—and no "handicapping" permissible under the rules.

Mr. Valentine then called upon the newly elected president, H. W. Reade, for a few remarks. Mr. Reade did not make a speech, which he said was not in his line, but told an interesting story.

Ole Erickson was the next speaker. He commenced by complimenting those who had prepared the excellent menu and then spoke of the good the association had done all those in the white cedar trade. He knew it because he had been benefited. At the last Escanaba banquet he had been accused of trying to talk the association to sleep, and assuring the banqueters that it was not his present intention to do so, he concluded.

The retiring secretary, Fred H. Gilman, was next called upon. Mr. Valentine stated that he understood Mr. Gilman expected to make his headquarters on the Pacific coast in the future and that he knew that all the members of the association would regret that he was obliged to do so and would miss him very much.

Mr. Gilman thanked the members of the association for their many favors and consideration during the three years he had been secretary, and referred to the many pleasant visits he had had with the members of the association in the past, either at their places of business or at their annual meetings. He said he had attended every annual meeting, excepting the first one. His relations had been very pleasant and he regretted exceedingly that he was now obliged to move away across the continent, and where he would see the members less often in the future. He hoped, however, to be present at their next annual meeting.

H. B. McMeal, editor of TELEPHONY, spoke briefly, after which the toastmaster called upon Frank N. Snell. Mr. Snell said that owing to his connection with Hoo-Hoo he presumed it was up to him to talk on that theme. He thereupon took advantage of that opportunity and outlined the plans of the House of Hoo-Hoo, the lumbermen's club being built at the World's Fair at St. Louis, and urged all present to join it.

E. H. Valentine said: You may not all be aware that the absence of Mr. H. S. Gilkey from this gathering is owing to the fact that he has recently undergone a surgical operation, from the effects of which he is still confined to the hospital. My advices are to the effect that he is out of danger and is convalescing. Knowing the esteem in which you all hold Mr. Gilkey, I propose that we drink to his health and that the secretary be instructed to send him the following telegram:

"Union League Club, Chicago, Jan. 5, 1904.

"The Northwestern Cedarmen's Association sends its New Year's greeting and best wishes for your early and complete recovery. May you live long and prosper. F. H. GILMAN, Secretary."

Mr. Gilman spoke of the illness of President R. H. Downing, who had expected to be present and had regretted very much that he could not come, having been taken ill the day before he meant to have left for Chicago. A similar telegram was sent Mr. Downing.

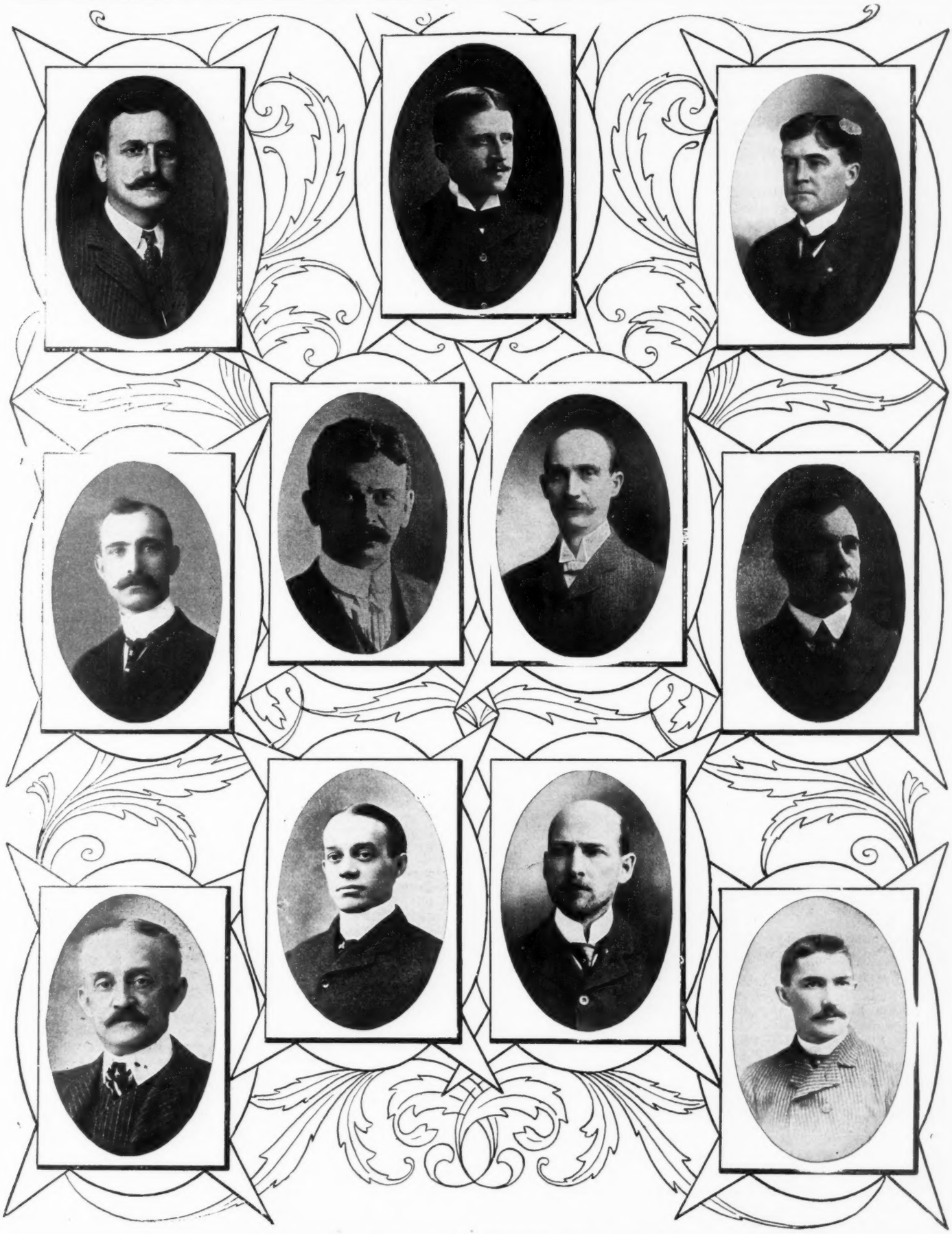
The newly elected secretary, J. F. Hayden, upon being called upon thanked the members for the honor conferred upon him. He believed the association had been very beneficial to its members and he would do all he could to make it more so.

A. P. Hopkins said it was the third annual he had attended and was sorry he had not been at more of them. He was glad he had come, however, but as he had understood it was to be a strictly business meeting he had not come prepared to make a speech. He thought the association was very much indebted to the Chicago contingent for the excellent banquet and suggested a rising vote of appreciation, which was heartily given.

M. B. Cross, a Chicago member, who was cross by name but not by nature, and Hall L. Brooks, "That Indian from Tomahawk, who had not brought his tomahawk with him," followed with some good stories, and M. H. Coolidge, among other things, said:

It has been a great pleasure for me to be with you here to-day and this evening. This is the third annual meeting that I have attended and I know our association is doing a great deal of good for the trade. We are getting better acquainted for one thing; our supply of cedar is growing scarcer every year and our country is settling up fast and using more of our product. If by a little care in the production and delivery of our product we can get a fair profit for our business it will pay us.

C. H. Worcester indorsed what Mr. Coolidge had said



REPRESENTATIVE CEDAR PRODUCERS AND DEALERS.

C. B. Brooks.
H. S. Gilkey.
W. C. Sterling.
E. L. Clark.
J. C. Kirkpatrick.
W. C. Sterling, Jr.
E. E. Naugle.
B. F. Vreeland.
W. J. Davis.
W. T. Reynolds.
A. D. Watson.

about stock growing scarce. He said he had tried to figure up the cedar supply for the next ten years and hoped that his concern was fixed to stay in the business that long. He believed, however, that in ten years from now poles longer than thirty feet would have to be obtained on the Pacific coast. He said he believed that only about sixty per cent of last year's stock was being put in this winter in northern Michigan.

G. L. Lindsley referred to the Pacific coast cedar, stating it would not get into the eastern trade except for poles longer than fifty feet, owing to the high rate of freight. This concluded talks of the evening, and after a little informal discussion of freight matters, during which the work of Chairman Carman, of the Western Railway Weighing Association, was highly complimented, the guests of the evening dispersed, having had one of the best times in the history of the Northwestern Cedarmen's Association.

ATTENDANTS.

Bissell, M. K., Erickson & Bissell, Escanaba, Mich.
Brooks, Hall L., Tomahawk, Wis.
Bowring, William P., C. H. Worcester Company, Chicago.
Bruett, T. M., Wilbur Lumber Company, Milwaukee.
Collins, W. Forman, Western Electrician, Chicago.
Conover, T. B., E. E. Naugle Tie Company, Chicago.
Coolidge, Marshall H., Marshall H. Coolidge Company, Minneapolis.
Cross, M. B., Francis Beidler & Co., Chicago.
Erickson, O., Erickson & Bissell, Escanaba, Mich.
Farnsworth, George J., Bay DeNoquet Company, Nahma, Mich.
Fitzgibbons, J. H., Wisconsin Timber and Land Company, Mattoon, Wis.
Forbrich, C. W., Western Electrician, Chicago.
Fowler, John H., Fowler-Jacobs Company, Chicago.
Fulmer, D. M., Fulmer-Kuester-Schroeder Company, Chicago.
Fulmer, J. W., Fulmer-Kuester-Schroeder Company, Florence, Wis.
Gerich, J. E., MacGillis & Gibbs, Milwaukee.
Gilman, Fred H., American Lumberman, Minneapolis.
Haines, A. W., Holt Lumber Company, Chicago.
Hayden, J. T., Mississippi Valley Lumberman, Minneapolis.
Hooper, J. R., American Lumberman, Chicago.
Hopkins, A. P., A. P. Hopkins & Co., Escanaba, Mich.
Huebel, C. J., C. J. Huebel Company, Menominee, Mich.
Jeffery, J., William Mueller Company, Chicago.
Kaufman, E. E., Carney Brothers Company, Chicago.
King, J. C., King & Bartles Lumber Company, Cleveland, Ohio.
Lang, F. J., Wisconsin Land and Lumber Company, Hermansville, Mich.
Lindsley, George L., Lindsley Brothers Company, Chicago.
Maltby, A., Maltby Lumber Company, Bay City, Mich.
Mackenzie, W. R., Brittingham & Hixon Lumber Company, Madison, Wis.
McDevitt, J. A., Cloquet Tie and Post Company, Cloquet, Minn.
McGillis, Daniel, McGillis & Gibbs, Milwaukee.
McMeal, H. B., TELEPHONY, Chicago.
Mock, Ed. J., TELEPHONY, Chicago.
Naugle, A. T., E. E. Naugle Tie Company, Chicago.
Navarre, J. Allan, Lindsley Brothers Company, Chicago.
Nicholson, George, Jr., White Marble Lime Company, Manistique, Mich.
Perry, Frank L., Western Electrician, Chicago.
Raber, P. W., Raber & Watson, Chicago.
Reade, H. W., Pittsburg and Lake Superior Iron Company, Escanaba, Mich.
Roberts, L. H., Paton, Iowa.
Robinson, F. W., Robinson-Freeman Company, Bovee, Mich.
Shrader, C. J., Francis Beidler & Co., Chicago.
Smith, Elmer E., TELEPHONY, Chicago.
Snell, Frank N., Milwaukee.
Thomas, W. B., White Marble Lime Company, Manistique, Mich.
Valentine, E. H., Valentine-Clark Company, Chicago.
Werner, F. W., Bradley-Watkins Company, Chicago.
Wheeler, W. G., Rockford, Ill.
Worcester, C. H., C. H. Worcester Company, Chicago.
Wright, J. K., Wright Bros., Marinette, Wis.

THE TELEPHONE ON GERMAN RAILWAYS.

The employment of the telephone on the Berlin High-Level Underground Railways has proved so satisfactory that its application to long-distance lines is contemplated. It is reported that the Siemens & Halske system has been introduced on the Prusso-Hessian state railways. The noteworthy features claimed for this system are the joining up of all the batteries at departure and terminus stations. The continuous current supplied by the batteries at either end to the telephones on the line not only furnishes the energy for the microphones, but, by the insertion of a current indicator, enables the entire apparatus to be regulated.

TELEPHONE PROGRESS IN 1903.

In its review of the electrical industry for 1903 the *Electrical World and Engineer* has this to say about the telephone:

During the past year there have been no striking developments in the technical side of telephony, but the steady progress in the perfection of details, and especially of the minor ones, which have been so characteristic of the preceding several years, has shown no relaxation, as our weekly review of telephone invention has borne witness The interest of inventors in automatic telephony has not abated, several new systems during the last year have been patented, and the older automatic systems have undergone steady improvement. The central energy system has become so thoroughly established in the art that an exchange not equipped for its employment may now be considered almost obsolete. A new field recently opened for telephony is in connection with railway working. The telephone of course has for some years been of much service as part of the dispatching system of electric railways, but its adaptation to the service of trunk line railroads has been a development of the past few years. Recently an impetus has been given to railway telephony by the perfection of a new and simple system for the simultaneous use of the same conductors for both telegraphy and telephony, and we are informed that a railway department has been established as a branch of the leading telephony organization of the country. This is not an innovation *per se,* since for ten years or more long distance telephone lines have been utilized for telegraphic purposes. In the early stage and possibly to some extent even to-day, one who leased a private telephone line was not aware that his wires were also leased for two telegraphic circuits.

The advent of new systems and notable improvements in devices are widely heralded, but it is not generally realized what a great part the engineer, as distinguished from the inventor, has quietly played in placing telephony on its present efficient footing with respect to continuity of service, the extension of exchange service and in making possible reduction of rates. As an example we may mention the use of lead-covered cables, which alone permits of properly distributing subscribers' lines in their present magnitude. Taking the case of great office buildings in the larger cities, each frequently containing several hundred telephones, a pole line of standard construction to feed such a building, assuming it to require 300 lines, would be some 160 feet tall, the cross arms beginning 20 feet from the street. The early types of telephone cables at once reduced the space required for such a number of wires to a few hundred square inches, while with more modern cables only some 16 square inches are required in which to conduct 300 pairs of wires. The step from the early lead cables with their large conductors, fibrous insulation and paraffine filling with consequent high electrostatic capacity, to the modern small conductor cable having six or more times the number of conductors in the same bulk, was no small one, and arrived at only after the most careful study and co-operation between engineers and cable manufacturers. The situation in this connection has been still further ameliorated by the invention of Dr. Pupin, consisting in so distributing inductances along the line as to neutralize the disturbing effects of capacity, whereby transmission through cables of commercial proportions may be brought to equal or even exceed that through standard aerial lines.

A somewhat curious recent development as reflected in patent office issues, is in the provision of means to prevent infection from the mouthpieces of telephones. Since according to the ethics of the medical profession a physician can not advertise legitimately, a certain class of medical men are prone to seek notice in newspapers by sensational announcements designed to attract to them the attention of the public. One of the subjects which several years ago served for this purpose was the alleged danger of infection from telephone mouthpieces, and since then scarcely a week has gone by without the issue of a patent on a sanitary mouthpiece attachment. Telephone users would, however, doubtless welcome an aurists' newspaper campaign that might lead to thought on the part of telephone inventors toward doing away with the cause that results in the violent "sound shocks" incident to the use of the relay system, which shocks at times are so severe as to be an actual danger to the hearing. The severity apparently has some connection with the temper of the operator, but in any event any improvement which can be made by telephone companies to eliminate this annoyance will most undoubtedly be gratefully welcomed.

Volt Meter Test Circuits for Common Battery Exchanges

CHARLES H. COAR

While the majority of the common battery exchanges have test desks equipped with apparatus suitable for handling the trouble occurring in them, there are some exchanges in which the means for testing lines is very limited. The circuits herein described are applicable to most of the common battery systems, and will give good service whenever a volt meter reading will suffice in locating trouble.

In the diagram jacks *1* and *2* are used to connect the set direct to the terminal rack, one jack being used to test to line, the other toward the switchboard. The test jack *3* terminates in a plug *p* at the switchboard and jack *4* is used to plug the voltmeter to battery. The jacks *5* and *6* represent the multiple and answering jacks respectively of a subscriber's line. The cut-off relay *k* is all that is shown of the line apparatus at the switchboard, as this is all that is necessary in describing the operation of this set.

The ringing key *c* is so wired that one is enabled to ring over each side of a circuit to ground or metallic as the line may require.

D is the test telephone key; *c* is the test key used in testing each side of a circuit to ground; *f* is for measuring short circuits and *g* is an order key to be used between the test set and the operator doing the switching. The operation of the set is as follows: The key *d* is thrown forward which feeds battery through the retardation coils *R 3* and *4* to the test telephone, after which the line number of the circuit to be tested may be given the switching operator over the order wire by pressing key *g*.

As soon as the plug *p* is inserted in the answering jack *6* current flows from the common battery through the plug sleeve to jack sleeve and from there through the cut-off relay *K* to ground, operating the relay which cuts off all the line apparatus at the switchboard. The voltmeter plug *b* can then be placed in jack *4*, which feeds battery through the retardation coils *R 1* and *2* to one side of the voltmeter direct. The remaining battery wire (negative side) is left open until either key *e* or *f* is thrown.

Voltmeter readings should be taken through standard resistance with the battery strength used, which of course would vary as do systems, and recorded, so that the resistance of a test may be known direct from the voltmeter reading.

Let us now presume that a line is up for a test, and we wish to test each side for a ground. To test side *L 1* to ground throw *e* key back and the circuit is as follows: The positive is already connected to the voltmeter, the negative side connects to the middle spring or key *e* from there, when the key is thrown to the outer contact where it splits, part going over the line to ground; the remaining current goes through the voltmeter to the exchange or battery ground. It can be readily seen that the voltmeter and the ground on the line are placed in multiple with the battery by this operation.

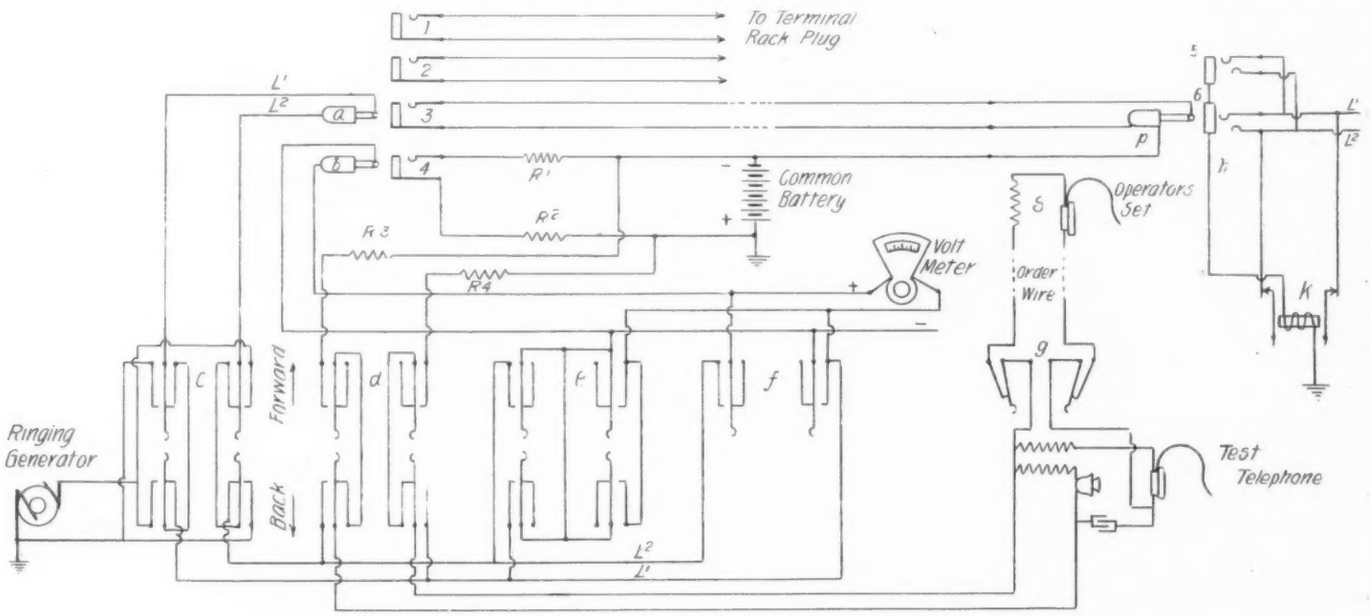
The better the ground on the line, the less the amount of current to flow through the voltmeter and vice versa according to the relative condition in resistance the voltmeter and line ground bear to each other. The same cycle of operations is gone through in testing the remaining side *L 2* by throwing *e* forward.

To test for a loop *x* or short circuit *f* key is thrown forward when the circuits may be traced as follows: The battery is fed through the voltmeter plug to the voltmeter and key *f*, which places the voltmeter and short circuit in multiple with each other and the battery.

The resistance would be determined in the same manner described in testing for grounds.

The key *d* controls the test telephone in the following manner: When the telephone is being used to talk to a subscriber whose line is being tested this key is thrown forward, which bridges battery across the line, supplying both telephones with talking battery. This is necessary for the reason that the subscriber's battery is cut off as soon as his line is placed upon the test trunk. In case the test telephone is to be used to answer a call through the exchange, the key *d* is thrown back, which bridges the telephone across the line in the usual manner, where it would receive talking battery from the coil circuit used in making the connection.

It will be seen from this description that the set is designed to give voltmeter readings only as it is by such readings that the larger share of exchange trouble is now located.



Wireless Telephony

JOSEPH B. BAKER.

The possibility of dispensing with a connecting line for the electrical transmission of articulate speech has undoubtedly been the subject of much thought and labor on the part of experimenters, from the time of the first announcements of Marconi's success in telegraphing through space without wires. As in the case of many other subjects of technical research, there is great danger that workers, in ignorance of what has been done and is being done elsewhere, may spend much time and money in fruitless labor that might have been avoided. It so happens that the writer has recently had occasion to look up many publications both in this country and abroad upon the subject of signalling through space without wires, both telegraphic and telephonic. Accordingly it has seemed that a concise account of what has been done by the more prominent workers in the field of wireless telephony might be useful and timely.

There is no question but that the year 1904 is destined to witness great advances in many electrical arts. Among these it is possible, if not probable, that the transmission of articulate speech by apparatus generally resembling that now used for wireless telegraphy may be developed a long way towards commercial success. That is, it is possible that the end of this year may see telephoning accomplished between widely separated stations equipped with the "vertical wire" or "antenna" now somewhat familiar as adjuncts of wireless telegraph stations. However this may be, the actual stage of telephonic transmission from and to a vertical wire, by the use of a spark-gap at its foot and of discharges controlled by any form of speech-reproducing electrical or mechanical apparatus, is still an uncertain and in many respects an unsatisfactory one. Unfortunately the public mind, fed as it is by irresponsible newspaper reports, has been to a great extent expectant of an early improvement in wireless telegraphy whereby telephone transmitters and receivers were to be hitched to a single tall mast, and wires, cables, and perhaps even central offices, were to be everlastingly banished. These impressions and expectations are by no means justified by the scanty and incomplete work that has been done (in true Hertzian-wave telephonic transmission) by workers of standing in the scientific world. Such an easy transmutation from telegraphically equipped wireless installations to such installations equipped for telephone transmission is by no means to be expected. This is realized very conclusively by those who have worked in the field of space telegraphy itself; for such workers have always been obliged to think out wholly novel methods, and to design their own special apparatus differing in almost all details of construction from apparatus used in ordinary wire telegraphy. That is to say, a wireless telegraph station of to-day bears no resemblance whatever to a wire telegraph station, barring the presence of, perhaps, a "sounder" or a tape "recorder" and a signalling key that looks like a distant cousin of those used in the old and more ordinary method. Therefore, the wireless station for telephonic transmission, when it does come, may not be expected to resemble, at all closely, any existing aggregation of telephone apparatus. It is more than probable that entirely new methods, worked out in the form of apparatus at present unheard of, will be made use of in future successful work with the vertical wire and spark-gap now exclusively appropriated to wireless telegraphy.

Before going into the history of two lines of research which have given practical results in transmission of articulate speech without wires, but which, however, do not make use of Hertzian waves, in any sense, a few words in regard to the difficulties to be anticipated in working from a vertical wire as above indicated may not be amiss. Recent work in wireless signalling by Hertzian waves has thrown a strong light upon the immense value of a connecting wire in the old methods of transmission of intelligence. That is to say, the success that has been reached in the face of gigantic difficulties, in wireless telegraphy, has made the enormous advantage of the possession of a metallic conductor connecting stations of the old "wire telegraphy" seem greater than it was ever before realized to be. Further, the value of this connecting wire—a value hardly begun to be drawn upon by present commercial use—is being looked upon in a far more scientific spirit by those who wish to see methods of rapid telegraphy replace the old and crude systems of "hammering brass" at one end of the connecting wire and "taking by sound" at the other end. Therefore, it follows that in abandoning the pair of wires necessary to commercial telephonic transmission to-day, many advantages, that look at present like absolute requisites of commercial service, will have to be abandoned, and replaced by new, and up to the present unheard of, principles of operation.

Coming now to the two methods above referred to as having had a measure of successful work, already done, established as a basis of improvements that may realize a practical system of wireless telephony: the first in order of time, and also as it happens the most spectacular in point of recent development, is the use of a beam of light caused to vary in intensity in correspondence with the articulations of the voice, and which by falling upon a "sensitive cell" at the receiving end reproduces the speech, thus transmitted over the beam of light, in an ordinary telephone receiver. The first work on this subject was undoubtedly done by Prof. Alexander Graham Bell with his "photophone." His description calls for a reflector such as a thin, silvered diaphragm, capable of being thrown into vibration by the human voice, and so situated as to direct a beam of sunlight or of artificial light upon another reflector at the receiving end, in the focus of which was located a "selenium cell;" the latter being connected in circuit with a battery and telephone receiver. The operation of this apparatus was satisfactory up to short distances only. Indeed, the most successful results with such a construction were obtained by abandoning the selenium cell altogether and substituting for it a "cell" containing some substance like a small quantity of burnt-cork capable of being thrown into acoustical vibration by the variations of radiation caused by the distant transmitter acting upon the beam of light connecting the two stations. In one form of apparatus that was quite successful over several hundred yards under favorable conditions, the burnt-cork was contained in a small glass tube, the open end of which was connected by a rubber tube to the ears of the listener, thereby dispensing altogether with the telephone and its electrical connections at the receiving end. Improvements upon this original device of Graham Bell were effected in the laboratory of the Bell Telephone Company, and developed later by Simon and Duddell abroad, by the use of the so-called "speaking arc" as a source of light and at the same time as the source of rapid variations in the strength of the beam of light whereby the articulate speech was transmitted. In one form of this apparatus, the arc was struck between carbon points connected to a storage battery or other steady current source; and telephone currents from the transmitter were, so to speak, superposed upon the steady battery current by the use of an induction coil with its secondary in the battery circuit supplying the arc, and

whose primary was connected to the transmitter and its (talking) battery. Such an arc presents no particularly extraordinary appearance to the eye, but is capable of itself "speaking" so as to be audible, through the air, to one listening in its vicinity. It is used in the kind of wireless telephone transmission described by placing the arc, connected as described to its transmitter, in the focus of a parabolic reflector whereby the varying beam is directed through a considerable distance upon a similar parabolic reflector equipped at its focus with a selenium cell. This organization is substantially that of Ruhmer; who, by improvements in the speaking arc, in the selenium cell particularly, and in several other details of the apparatus, was able, in the summer of 1902, to transmit articulate speech through clear space over a distance of 15 kilometers in all weathers. The records of his work in foreign magazines indicate a large amount of quantative experimental work upon all of the "side lines" of his project, and is an instance of the large amount of such side work necessary in developing a new invention: a fact not always realized as it should be by the financial backers of an inventive enterprise.

Of course the photophone scheme of wireless telephony, of which Ruhmer's work is the best expression to date, requires clear space for its operation. It cannot, as wireless telegraphy can, reach around the curvature of the earth. It can be intercepted; although such interception does not also necessarily mean ability to read the message unless the intercepting parts was provided with the proper receiving apparatus. In this aspect it compares with the use of the heliograph, familiar for many years in military signalling, and which cannot be both intercepted and read by an enemy without possessing the code.

The other scheme of wireless telephony, although in its practical development of later date than the one just described, in reality harks back to the early and all but forgotten suggestions of the Scotchman Lindsay, whose memory British scientists are now delighted to honor. It seems that Lindsay early had the idea of dispensing with wires in telegraphing and sought in vain to put it to practical test. It was an instance of a man of scientific imagination being ahead of his age, and he died without receiving recognition of the value of his suggestions. The work that has been done upon Lindsay's method is well described in some British technical publications of about the year 1892, at which time Wm. H. Preece, the head of the British government telegraph system, performed some elaborate and thoroughly scientific experiments with the so-called "leakage method" of transmission of signals without wires: that is, the utilization of the spread of lines of current flow in the earth, or water, between the grounded ends of a wire carrying the signal current and strung generally normal to the direction in which the signalling was to be effected, whereby the signals (in the case above described, articulate speech currents) were received in apparatus of the usual type connected in a second wire generally parallel to the first and having its ends also grounded. To express this a little differently, telephoning was found to be possible across a river, for example, by talking upon a wire strung along one bank of the river, for a distance great compared to the width of the river, and terminating in ground-plates, and listening upon a similar wire strung along the other bank of the river and similarly grounded. In the hands of Sir Wm. Preece practical and valuable results were obtained over considerable distances; although his work was interrupted by the greater interest excited by the early experiments of Marconi, promising as these did the reaching of greater distances for telegraphing and by a more spectacular and novel method. The great difficulty experienced by Preece, as by all other workers upon this scheme, lies in the great length of wire necessary to be strung normal to the direction of transmission, compared to the "reaching distance." Moreover, the scheme has been found to be less "penetrative" for commercial telephone transmission than for telegraph signalling. Indeed, many of Preece's most successful experiments were in telegraphing, making use of delicate receiving devices mechanically tuned to the period of the currents employed in signalling; by which means the sensitiveness of his receiving devices was greatly increased, and a greater signalling distance reached. Such advantages cannot be attained, in the nature of things, for telephone transmission wherein the frequency of the signaling current becomes the widely varying frequency of the sound-vibrations of the voice.

There have been some experiments by Messrs. Armstrong and Orling during the past year, that have been largely devoted to attempts to shorten the amount of wire to be strung for a given signalling distance between the two wires. But further patient and able experimenting is needed to make the system at all successful commercially.

IOWA TELEPHONE CLEARING HOUSE.

A meeting of Iowa telephone men was held at Des Moines, Iowa, recently to take up the matter of handling and adjusting toll rates.

E. H. Martin, of the Martin Telephone Company, of Webster, Iowa, was appointed a member of a committee to draw up articles of incorporation and perfect plans for the establishment of a telephone clearing house in Des Moines at an early date. All toll line accounts will be turned into this office for auditing. The office will make all adjustments, figuring up the proportionate share of tolls. It will probably begin with a manager at a salary of $1,800 a year and three clerks.

The committee will recommend that the division of toll charges under the new telephone clearing house system be on a mileage basis. Each company will receive a share of the toll from messages in proportion to the miles of line used, instead of a percentage as by the present system, under which the originating company gets the lion's share of the receipts. The new clearing house will more nearly equalize the work and responsibility falling on each company, say the committee, and in the long run, they believe that the mileage basis will be fair and equitable to all.

The clearing house will be incorporated, probably with an authorized capital of $10,000. Each subscribing company will buy one share and be entitled to one vote in controlling the business. The company will not be run for the purpose of paying dividends. The expenses will be paid by a charge for each message checked. What is left after the expenses are paid will be rebated to the companies according to the number of messages checked for each. In this way, all will pay their share of expense according to the benefits derived.

The committee will report at the meeting of the Independent Telephone Association, March 8, and, if as is altogether probable, their report receives the approval of the meeting, the clearing house will be in operation within a very short time thereafter.

The committee will seek the co-operation of all companies in the state in furthering the plan. Independent telephone men claim that no one county in Iowa is without many mutual lines, and that the men here yesterday represented more invested capital than the total investment of the Bell interests in the state. It is estimated that the clearing house can open for business with an average of 30,000 toll line calls a month. Two-thirds of the Independent telephone mileage of Iowa was represented at the meeting.

KANSAS CONVENTION.

The third annual convention of the Kansas Independent Telephone Association was held in Topeka, Kansas, on January 28, 29, 1904. A full report of this convention will be given in the next issue of TELEPHONY.

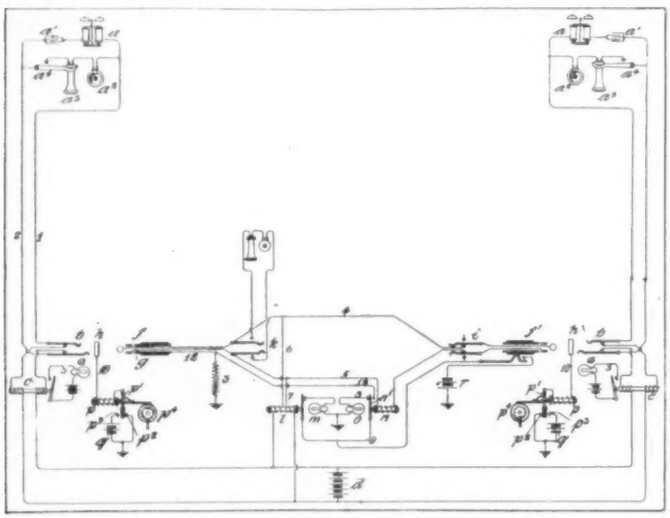
DIGEST OF TELEPHONE AND KINDRED PATENTS

Information concerning any patent will be furnished without charge by addressing Edward E. Clement, Editor of this Department, McGill Building, Washington, D. C.

Reissue 12,185.—Connection counter for telephone lines. F. R. McBerty.

This is a system for counting calls in giving measured service. The original patent was No. 641,400, and was dated January 16, 1900.

According to present practice only complete connections are registered, and Mr. McBerty, therefore, provides that the register shall be worked by the called subscriber in answering. For each line a register p^4 is provided, actuated by a magnet p, connected to the jack-ring h. All of these magnets are normally inoperative, being deënergized. When a call is answered, say, from the left-hand station in the figure, the test ring h is connected to the sleeve g of the answering plug. When the calling plug f^1 is lifted from its seat and inserted in the wanted jack, battery r is connected back through the plug seat switch and through wires *9*, *12* and *10*, to the magnet p, and through its armature to the

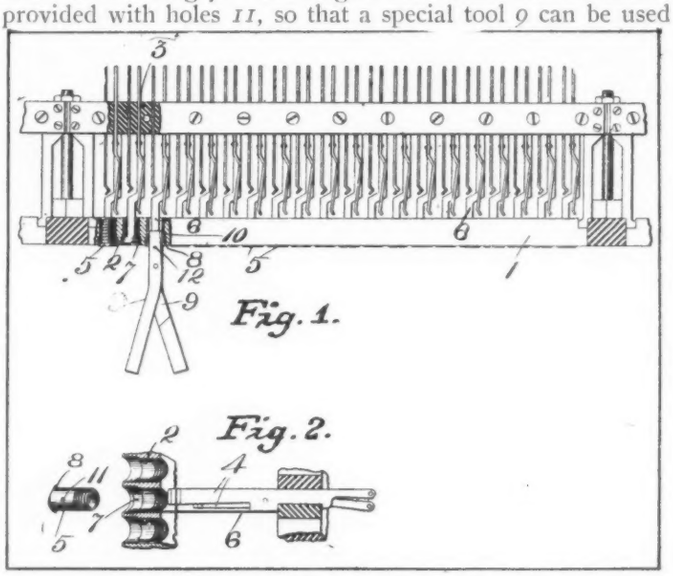


12,185—CONNECTION COUNTER.

ground, supposing the right-hand subscriber to have immediately removed his telephone from the hook, to energize the magnet n and thereby retire his supervisory signal o, and join the conductors *9* and *12*. The magnet n is energized by the current from the battery d flowing over wires *6* and *7* through the metallic circuit. When the magnet p is once energized it not only work the register, but remains energized, as the armature in moving up closes a circuit through battery q, wires *10* and *12* and a resistance s to ground, this circuit being severed when the lines are disconnected.

747,421.—Multiple switchboard. C. M. Hedman.

This is a form of spring jack particularly suitable for multiple boards. The idea is to avoid the necessity for soldering the test thimble to its tail spring, or making them in one piece. Mr. Hedman makes each test thimble *5* separate, with a shoulder *8* and screw threaded on its inner end. The tail spring *6* is punched out with a side strip *7* at one end, which is formed up into a ring to lie within a shouldered recess *2* in the boring through the front strip *1* of the multiple strip. In assembling, the tail strip and the ring *7* are first put in position, and then the thimble *5* is inserted from the front and screwed home, its shoulder *8* making firm contact with the ring *7*. The ring is slotted and the thimble is provided with holes *11*, so that a special tool *9* can be used

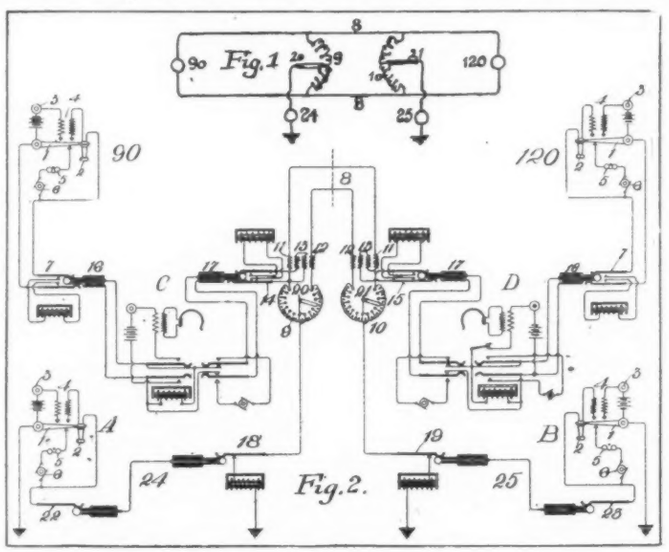


747,421—MULTIPLE SWITCHBOARD.

at any time to withdraw both thimble and spring from the front. This patent is assigned to the Stromberg-Carlson Telephone Manufacturing Company.

747,491.—Telephony. H. O. Rugh.

This is a system for duplex transmission, based on the old idea of using the two wires of a metallic circuit in series for



747,491—TELEPHONY.

the metallic circuit, and in parallel as one side of a second circuit, usually grounded. In such cases connection has been made from the two separate circuits to their common portion either by means of bridged coils or divided series induction coils. Mr. Rugh uses both methods, his specific inven-

tion consisting in providing his bridged coils with movable switch arms so that the line connections can be balanced up by cutting in and out resistance reciprocally in either direction at will.

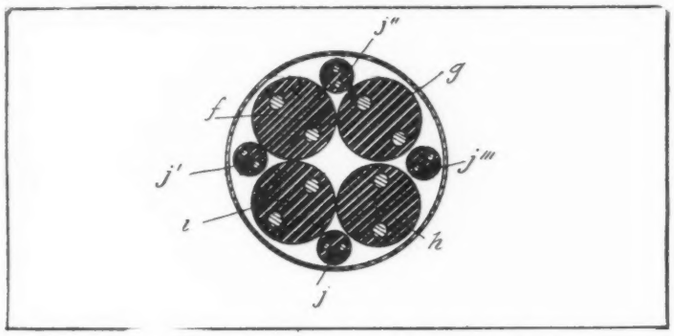
Fig. 1 is a skeleton diagram of the circuits, and Fig. 2 shows the same as applied to a central office equipment. *90* and *120* are two stations included in the metallic circuit *8*. *24* and *25* are connections through subsidiary stations from ground to the switch arms *20* and *21* are thence to the line wires *8* in parallel, thus forming a second circuit. The switch arms *20* and *21* are movable over series of contacts in the rheostats *9* and *10*, and by moving these arms more or less resistance may be reciprocally added to and subtracted from the two sides of the artificial circuit, as may be required to balance up. Without this balancing it is stated that there will be cross talk between the metallic and the phantom circuit.

In Fig. 2, a trunk line *8* is shown extending between central offices *C* and *D*. At station *C* it terminates in the bridged resistance coil *9*, and at station *D* in coil *10*. At each station a series connected repeating coil with its windings divided and connected on opposite sides of the trunk, connects the terminal jacks *14* and *15* of the metallic circuit. From the switch arms *20* and *21* extend connections to the terminal jacks *18* and *19* of the grounded or phantom circuit. The metallic circuit stations *90* and *120* are shown connected by plugs *16* and *17* with the metallic jacks *14* and *15*; while the grounded stations *A* and *B* are plugged in on the jacks *18* and *19*. The effect is precisely the same as shown in Fig. 1.

This patent is assigned to the Illinois Electric Specialty Company, Chicago.

747,515.—Telephone or like cable. F. Tremain.

This is a telephone cable designed by an Englishman. While he does not go into particulars, he evidently intends to lessen the mutual or reciprocal capacity effect in cables by keeping the conductors of a pair some distance apart, but using what looks like a solid insulator, probably some compound of rubber. The scheme is very simple. In the figure,



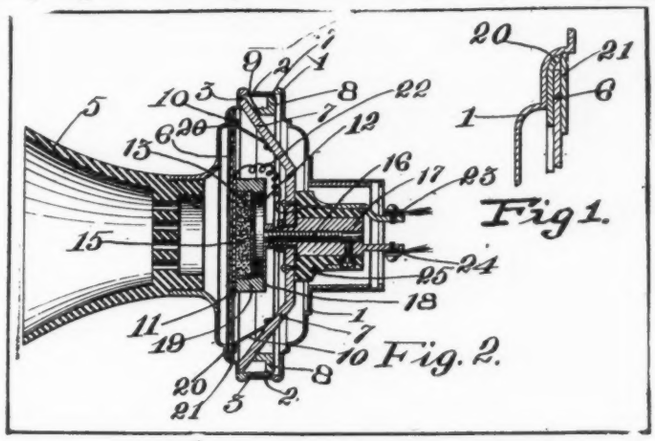
747,515—TELEPHONE OR LIKE CABLE.

f-g-h-i are four insulating bodies, each containing a pair of conductors, each pair being used for short distance work. Opposite pairs, as *f-h* and *g-i*, are used to form the opposite conductors of phantom long distance circuits. The pitch of the twist of each pair of wires is preferably different from that of the others, and smaller strands are used to fill up, as shown.

The popularity of such a form of cable, where smaller cables with dry paper insulation are known and used, would seem to be extremely problematical, except possibly for submarine purposes.

747,602.—Battery transmitter. J. S. Goldberg.

This patent, which is assigned to the Stromberg-Carlson Telephone Manufacturing Company, covers details in the construction of a solid back granular transmitter. The diaphragm *6* is insulated from the front plate *1* of the casing or shell of the instrument by gaskets *20* and *21*, as shown in Fig. 1. On the diaphragm rests a felt ring *19*, and the rear electrode *12* has four spring fingers stretching out radially over this ring as shown at *18*, so that the ring is not compressed by any rigid body in making adjustments. The diaphragm is held against the front plate by four springs

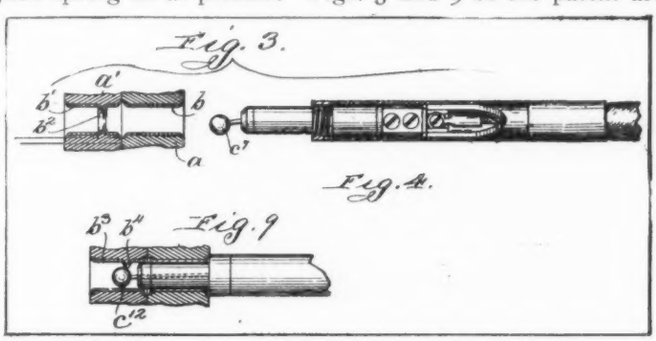


747,602—BATTERY TRANSMITTER.

10 fastened on the four legs of a spider *7*, and over the spider is a follower ring *8* which centers all the parts automatically as it is screwed home in the casing during assembling. The ends of the spring *10* rest on the gasket *21*, so that they are insulated from the diaphragm.

747,911.—Connection terminal and plug. W. W. Dean.

Mr. Dean is quite an adept at reversing the usual order of things. As everyone knows, the usual connection terminals on a switchboard comprise solid plugs and yielding jack springs. Mr. Dean here presents a jack with solid contacts and a plug with a yielding tip. He says this arrangement enables him to make his jacks smaller, and to cause the concentrated wear to come on the plug tip instead of on the jack spring as at present. Figs. 3 and 9 of the patent are



747,911—CONNECTING TERMINAL AND PLUG.

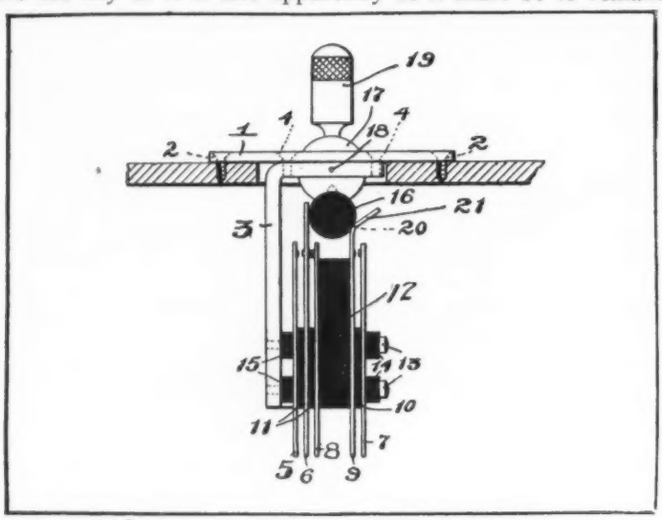
given herewith. *b* is the thimble of the jack, and b^1 is an inner thimble formed with a shoulder b^2 corresponding to the usual bend in the jack spring. The plug sleeve makes solid contact with the thimble *b*, and the spring tip c^7 passes over and into engagement with the shoulder b^2. The tip stem is bent so that the tip center is normally eccentric to the axis of the plug, but is prevented from touching the sleeve by an interposed insulating lining. The patent is assigned to the Kellogg Switchboard and Supply Company.

747,778.—Express or other annunciator. J. H. Rusby.

While not strictly a telephone case this has a bearing on some types of battery annunciators. It comprises a casing with a lamp inside the back and two swinging transparencies in front, each controlled by a magnet to turn it up and another to turn it down. Circuits and switches may be controlled from any point.

748,397.—Circuit changing apparatus. W. Meyer.

This looks like a Kellogg key. The patent, however, is assigned to the Stromberg company. Description is almost superfluous. The first claim, although long and specific, covers the key as it is and apparently as it must be to remain

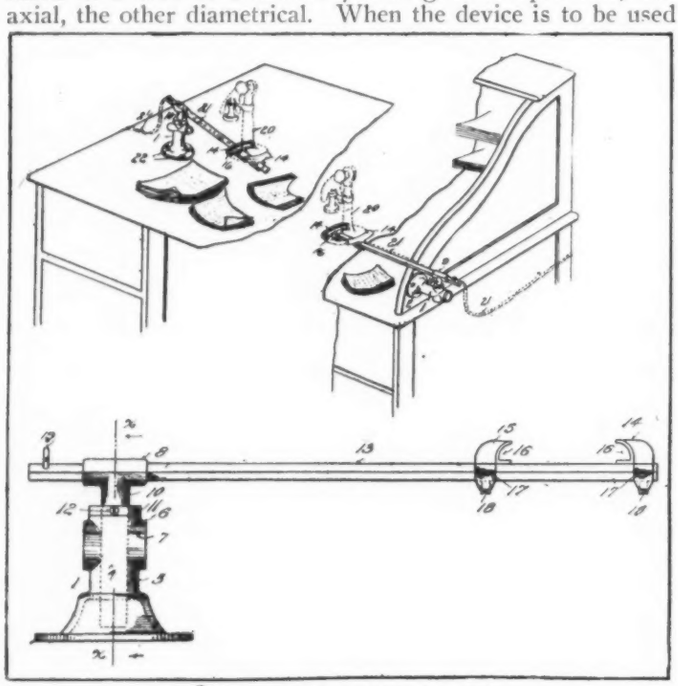


748,397—CIRCUIT CHANGING APPARATUS.

the same key, the present limitation being in the inclusion of the long block of insulation, *12*, between the springs *8* and *9*. The application for this patent was filed October 10, 1901.

748,524.—Telephone support. C. H. Pelton and W. Ramsay.

This is a swinging support for a desk telephone applicable to either a flat top or a roll top desk. A square bar *13* slides in the cross top of a T-branch *8*, and is hollowed to carry the cord of the telephone. The stem of the T-branch is journaled in a base or standard *4* having cross apertures, one axial, the other diametrical. When the device is to be used

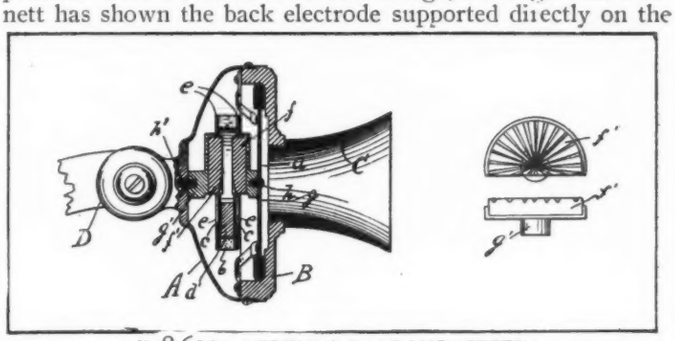


748,524—TELEPHONE SUPPORT.

on a flat top desk the standard is used in an upright position with the T-branch in its axial hole, and when used on a roll-top desk the standard is secured to the side with its diametrical aperture vertically aligned. In either position the bar *13* can be turned and will slide to carry its end in all directions. On this end a pair of clamps *14-15* secure the base of the desk type of telephone employed.

748,690.—Telephone transmitter. C. F. Bennett.

This is a granular transmitter designed to be "non-packing." The diaphragm is supported on the front plate as usual, this plate is supported in a shell *A*, and presumably in practice there would have to be a bridge, although Mr. Bennett has shown the back electrode supported directly on the



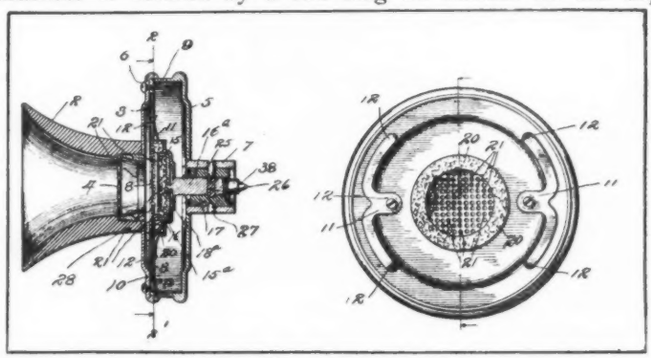
748,690—TELEPHONE TRANSMITTER.

shell, so that in order to get at the inside of the instrument the electrodes must be separated—which is very poor designing.

The diaphragm carries one electrode *f*, of a shape like a half moon, and the shell carries the other f^1 of the same shape. The flat side of the electrodes is down, and a pair of mica disks with a fiber block between them fills up the otherwise vacant space at *d*. A felt ring *b* surrounds the parts, and mica rings *e* complete the outfit. The faces of the electrodes are preferably provided with radial serrations which are supposed to stir up the carbon as the instrument is used, while the flat floor furnished by the fiber block *d* tends to prevent packing.

748,906.—Transmitter. E. E. Yaxley.

This is a transmitter gotten up by Mr. Xaxley in 1901, and assigned to the American Electric Telephone Company. It has one or two novel features. One of these is the manner in which the front electrode is formed, being composed of a layer of the carbon granules stuck to the diaphragm with a conducting cement. The instrument is of the flat shell variety, with the Victor type of contacts. The diaphragm is held against the front plate by springs *12*, and the chamber is formed by a felt ring *20* carried on the cup



748,906—TRANSMITTER.

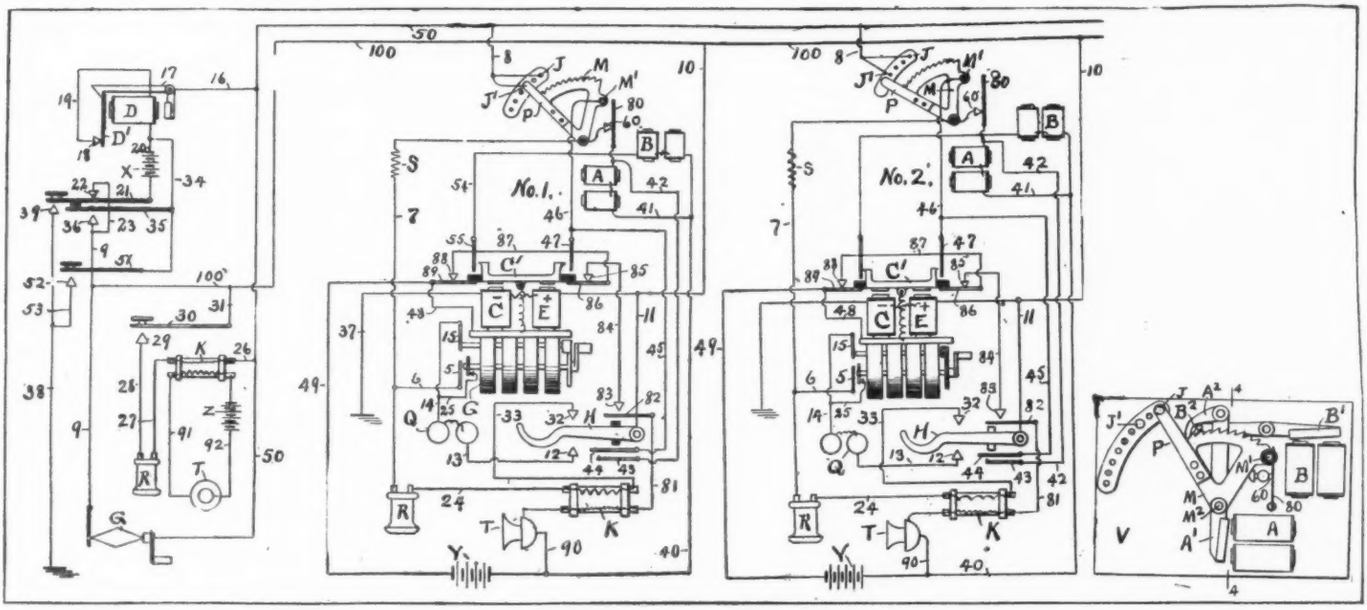
15, which is supported on the stud *16a*. In the chamber is a perforated screen or diaphragm *21* with granules on both sides of it, the idea being to keep the carbon loose. The back electrode is a flat carbon disk supported in the cup and having circular ridges in its face. The stud *16a* is threaded into the insulating block *17* which is secured in the stem *7* of the shell by the pin *27*. After the stud is screwed up into adjusted position a pin *26* of insulating material is driven through it from the outside, so there can be no tampering with the adjustment except by drilling out the pin or break-

ing it off. The end of the stud is tapered so that it cannot be turned with pliers.

The circuit through this instrument is by way of the stem *7* to the diaphragm, back through the carbon chamber through the back electrode and out through the stud.

748,980.—Telephone exchange. N. E. Norstrom.

This is a selective party-line system, using magneto currents for signalling and ringing, and local batteries for talking. Each sub-station is provided with a step by step switch, an actuating magnet and a restoring magnet therefor, and a polarized relay for controlling these magnets, in addition to the ordinary apparatus. The central office has a pair of pole changing keys and a battery for selecting, and a generator for ringing up. The diagram herewith shows the central station at the left, and two stations connected thereto through the metallic circuit *50-100*. At each station the actuating magnet for the switch is shown at *A*, and the restoring magnet at *B*. These magnets are in local circuits controlled by the polarized *C-E*, the magnet cores of the latter being polarized by being mounted directly on the field magnets of the generators *G*.



748,980—TELEPHONE EXCHANGE.

Supposing station No. 1 desires to talk with a subscriber on another line. The generator *G* is actuated to send current over the wires *50* and *100* to energize the annunciator magnet *D* and throw down the drop D^1 at central in the usual way. Connection is then established presumably through a jack (not shown) and ordinary cords and plugs. If station No. 1, however, desires to talk with another subscriber on the same line, as at station No. 2, he first rings up central, then takes down his receiver, which bridges his telephone across the line, and central depresses the key *30* to cut in her telephone *R-T*. Subscriber No. 1 then hangs up his receiver, and the operator presses key *21* twice sending two pulses of current from the battery *X* over the following circuit: *X, 21, 39, 38*, ground to sub-station, *37, C-E, 10, 100*, back to central, *9, 36, 35, 34, 20, X*. The relay *C-E* then tilts its armature C^1 to close against spring *47* and complete the following local circuit at each and every sub-station: *47, 45, 44, 43, 42, A, 41, 40, Y, 49, 48*, base of generator *G*, armature C^1, *47*. This energizes the actuating magnets *A* at all the sub-stations twice, once for each impulse from central, thereby stepping around the switch arms *P* two steps, leaving the arm at No. 1 station connected through contact point J^1 with wire *50*, and all the others on blanks, because these contacts are differently spaced at all the stations. The operator then rings up, calling No. 1, who knows that his own connection is complete. The operator then sends an additional impulse by key *21* to call station *2*, and again rings up. Station 1 is not disturbed by the additional impulse because the receiver is off the hook. When station *2* responds conversation proceeds in the ordinary way over the metallic circuit, and no other station can listen in by reason of the fact that all other switch arms are left on blank points. At the end of the conversation the subscribers ring off in the usual way, and the operator at central depresses the key *51*, thereby sending a current impulse of opposite polarity over the selective circuit previously traced through the relays *C-E*. This tilts each armature C^1 to close on spring *55* and complete the circuit of the restoring magnets *B* as follows: *55, 54, B, 40, Y, 49, 47*, base of generator *G*, armature C^1, and *55*. The magnets *B* lift the pawls shown in the smaller figure herewith at B^2, and suitable coiled springs return the switch arms *P* to zero.

The circuits in this case, I believe, could be simplified, and the system might well be adapted to work on a common battery. When so developed, the apparatus would boil down to a switch and a pair of polarized magnets. In such case there would appear to be a great deal of merit in the invention, and a good field would be open to it.

749,225.—Telephone system. H. Redmon, R. L. Hall, and R. H. Conway.

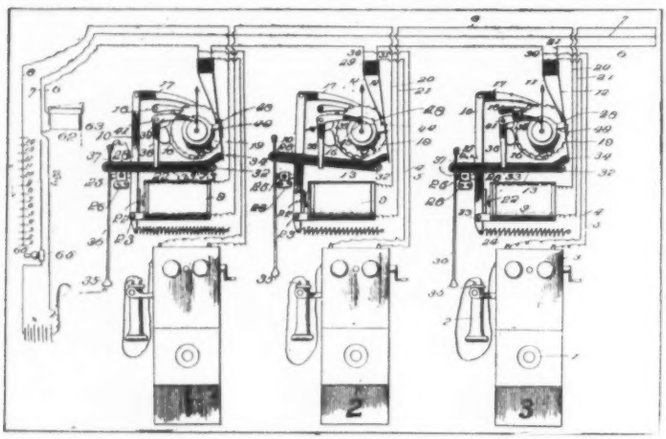
This is another selective party-line system, wherein the selecting of the subscribers who may converse at one time is done from central and all others are automatically locked out. Three wires are employed, extending to all the stations. At the central office, shown on the left in the figure, the selective transmitter is connected with its battery across the wires *7* and *8*, and an annunciator *62* is connected across wires *6* and *7*. The transmitter consists of a sliding contact *65* forming a terminal for the battery, and a series of fixed contacts over which the contact *65* can be passed to send one, two or more impulses.

At each sub-station a telephone instrument *1*, *2*, or *3*, is provided, fitted with the usual talking outfit and a hand generator and ringer. The wire *6* passes through all the stations in series, being connected to the telephone at each. Each telephone is normally shunted out, however, by the springs *11-12* closed together until opened by hand or from central.

At each sub-station is also provided a selective device

actuated by a magnet *9*, all of these magnets being included in series in the wire *8*, which is the signaling wire, wire *7* being a common return for both signals and talk. Each selective device comprises a step-by-step mechanism worked by a pawl *17* on the upper end of an armature lever *10* controlled by the magnet *9*. On the same shaft as the toothed wheel *19* engaged by the pawl *17* is a cam disk, carrying a cam *48*, each cam being set at a different point on the periphery of its disk, and each cam adjusted so that when turned through the proper angle it will engage the spring *12* of its shunt pair and cut in its home telephone. Retrogression of the wheel and cam is prevented by a stop-pawl *18*, and when both pawls are lifted, a suitable coiled spring returns the mechanism to zero. This is accomplished by a trip *16* carrying a weight and journaled on the shaft. When the toothed wheel has made an entire revolution this trip is lifted by a pin on the wheel, lifts both pawls *17* and *18* and itself catches on pawl *17*, to be reversed when the magnet *9* de-energized.

To select a station from central it is only necessary to move the contact *65* over the proper number of points, which moves around the cam *48* to break the shunt *11-12* at the desired station. The telephone can then be rung up in the usual way. To break the shunt by hand at the sub-station



749,225—TELEPHONE SYSTEM.

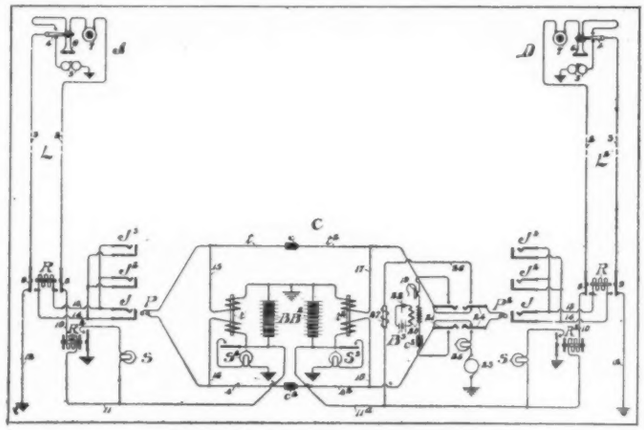
preparatory to signaling to central a lever *13* and a push handle *35* are provided. As the lever lifts on pivot *32* it pushes over spring *12* as shown at station 2, and the telephone is in circuit.

When the line is in use all the wheels are stepped around from the normal position, and all telephones not in use are locked, each by a lever *38* pushed over a pin *22* by a cam lever *39* on a cam disc on the main shaft when the latter starts. When the lever *13* is raised it is held up by the pin *28* engaging a notch *27* in the armature lever. At the end of a conversation central pushes up the contact *65* as far as it will go, which sends all wheels around to the limit, when they automatically restore themselves and all the levers are dropped.

This system also has commercial possibilities, and should certainly be worked out for common battery. No substation apparatus should be used in any case where it can be avoided, except the simplest common battery form boiled down practically to a transmitter, receiver and bell.

749,306.—Telephone system. A. D. T. Libby.

This is an improvement in the Dunbar, Miller, Dean two-wire multiple system, used by the Kellogg Switchboard and Supply Company. In such common battery systems a cut-off relay is always employed, and in the Kellogg system particularly the cut-off relay is energized by current over the talking circuit, being permanently bridged thereon. Being thus in the talking circuit, and the cord circuits being opened by the ringing keys between the main battery and each calling plug, the consequent cessation of current through cut-off relay will disable the latter unless an auxiliary means is provided. Mr. Libby runs a separate battery wire to the ringing key, which is completed when the cord-



749,306—TELEPHONE SYSTEM.

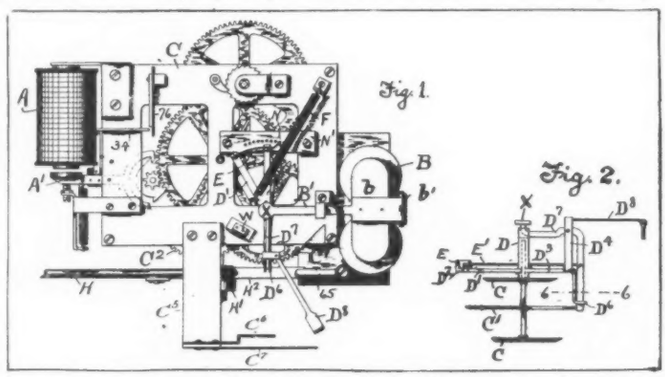
circuit is broken, so that steady current is kept on the cut-off relay.

In the diagram the figure represents the usual Kellogg layout, and the invention is comprised in the parts *26-27*, the former a wire extending from the ringing key *24* to the live side of the battery *B2* through the wire *11a*, and the latter an impedance coil wound, so it is said, to 290 ohms.

When the calling plug *P2* is inserted in a jack *J* of the line *12*, current from battery *B2* passes over the conductors *17*, *24*, *P2*, *13*, to cut-off relay *R*, and back by conductors *14*, *P2*, *24* and *18* to the battery. When the ringing key *24* is used this circuit is interrupted, the generator *23* being connected to one side of the circuit and the battery wire *26* to the other. Current then flows through the cut-off relay by the following path: Battery *B2*, ground, to generator *23*, *24*, *14*, relay *R*, *13*, *24*, *26*, *27*, *11a* and back to battery. The generator current does not back up in this circuit because of the choke-coil.

749,308.—Telephone exchange. F. A. Lundquist and J. K. Norstrom.

The invention in this case relates to automatic selective apparatus and is in the nature of an improvement on the mechanism patented to Frank A. Lundquist May 9, 1899, No. 624,666. The invention itself is shown principally in Fig. 2 herewith, and the full mechanism in Fig. 1. The machine is a step-by-step selective switch for use in party-



749,308—TELEPHONE EXCHANGE.

line systems. In Fig. 1 the magnet *B* has an armature *b*, pivoted at *b'*, and fitted with an arm *B'* having an end finger *X*. This finger *X* overlies the end of the spindle of the rotary switch, and as the magnet pulls it up or down the finger moves a clutch lever connecting and disconnecting the switch contact *E* and its arm *D'* with the gears of the train

by which it is actuated. This clutch lever is a bell-crank *D7* pivoted on the post *D4* secured to the radial arm *D3* on the central sleeve *D*, which also carries the radial arm *D'*, on which is mounted the contact spring *E*. From the outer end of arm *D3* extends down a forked arm *D6* serving as a guide for the lower end of the lever *O7*. *C'* is the actuating gear of the train, and *D8* is a swinging finger normally between the screens *C6-C7*, but swung out, as shown in Fig. 1 when the line is in use.

In operation the finger *X* is depressed to restore the mechanisms, and when the magnet *B* is de-energized the contact arm is coupled up with the operating wheel *C'*, as shown in Fig. 2.

In the diagram, Fig. 3, the central office is shown at the left, provided with the annunciator drop *M*, jack *40-45* and terminal keys *60* and *71*, adapted to connect the two line wires to battery *X* at will. At the subscriber's station *E* is the selective switch having its arm passing over a number of contacts, to one of which *N* the particular substation circuits are connected, this one being different at each substation. *A* is the actuating magnet for the normally wound clock train, permitting the escapement to move one step each time it is energized over the wire *100*. When the magnet *A* is energized by means of the use of key *60* at central the magnet *B* may also be energized if the operator depresses the key *71*, this sending current simultaneously over both line wires and ground.

In operation, if the subscriber desires to talk with another one on the same line, he calls central in the usual way by means of his generator *G*, and central on learning the number wanted depresses the key *60* the proper number of times

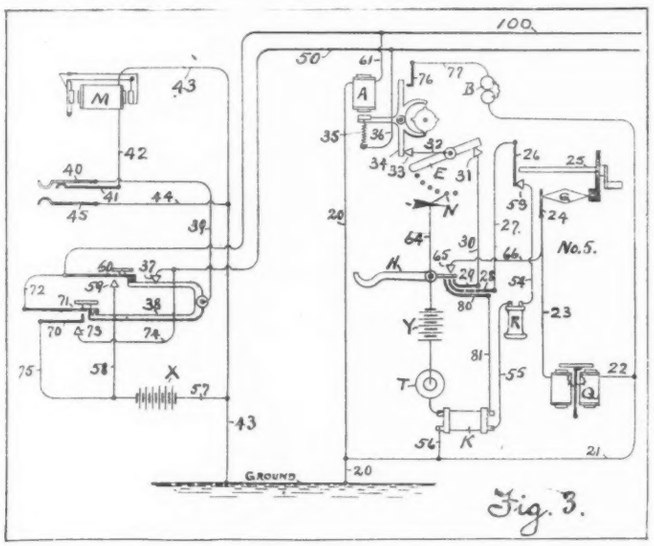


Fig. 3.

749,308—TELEPHONE EXCHANGE.

to step around all the switch arms to the point on their switches to which the desired station on its switch is connected. The wanted subscriber is then rung up in the usual manner, and conversation proceeds, both telephones being bridged. Upon the termination of the conversation the operator depresses the key *71*, which puts both sides of line to battery, which results at each station in the magnet *A* connecting the magnet *B*, the magnet *B* depressing the finger *X*, and so turning the bell crank lever *D7* to release the contact arm *E* from the clock train, and the spring of the latter returning it to zero. At those stations whose receivers are on the hooks no effect is produced, as each hook *H* when down presses against the gear *C2* and locks the train.

749,388.—Locking device for telephone apparatus. S. J. Larned and J. S. Ford.

The American Telephone and Telegraph Company, formerly yclept the Bell Telephone Company, is certainly a cruel, hard-fisted, heartless and totally unconvertivable montrosity. The present patent is assigned to that company, and disclosures tell a heart-rending tale. Not that the specification is anything out of the ordinary, being in fact very quiet and prosaic, albeit has passed under the keen eye and artistic hand of our revered friend, Mr. Thomas D. Lockwood. The device itself is simple enough, moreover, consisting merely of a little jointed rod *1, 2, 3*, which can have one end 5 stuck in the slot of the switch-hook escutcheon of a telephone, and the other end stuck through the eyes thereof, a padlock *L* completing the the decorative effect, and incidentally preventing the removal of the device, with the result that the receiver cannot be taken off the hook nor can the hook be raised to call central.

This seems a simple tale enough, but upon reflection what

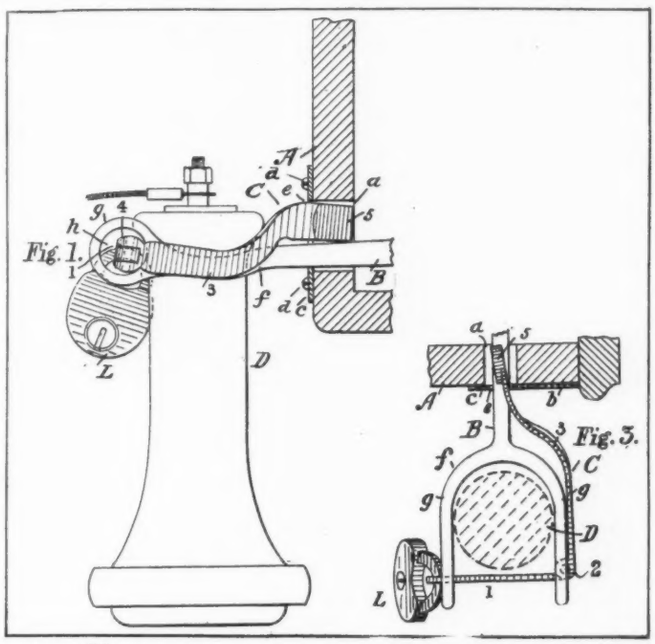


Fig. 1. Fig. 3.

749,388—LOCKING DEVICE FOR TELEPHONE APPARATUS.

a soul-harrowing picture is evolved! Behold the fearful octopus, rampant and seeking to devour, forcing the shuddering Larned and Ford to their horrid task of devising another instrument of torture for the wretched subscriber. Not content with giving him poor service, not satisfied with charging him for many calls he never made (of which he is quite certain) and with robbing him of connections by telling him "the line is busy," when he knows it isn't, the brutal trust now adds the final insult to oppression—it forces him to pay his bills. Heretofore a lineman or inspector has come around on such occasions and after his departure a wire has been found disconnected. What more simple than to reconnect it and so continue the service? Bills are but incidentals. We live for other purposes than satisfying creditors, and as long as the telephone service is necessary to us and the payment of the bill is not, why need we worry? But behold an end to such philosophy, for a good padlock, like love, laughs at locksmiths (anyhow at amateurs), and so we begin to see dimly that we must face tyrannic fate and pay up or do without the telephone.

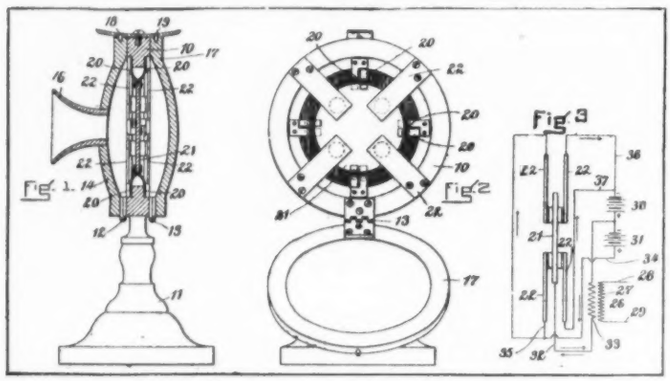
The attorney general having now bagged the salt trust, what is the matter with calling his attention to this latest outrage?

749,448.—Telephone transmitter. P. G. Randall.

This is a transmitter which constitutes an improvement on a very similar instrument patented many years ago to C. A. Randall, who, I suppose, was the father or some other relative of the present patentee. The purpose of this transmitter is to produce current reversals in the primary circuit of

an induction coil. The apparatus comprises a standard *11*, carrying a ring *10*, within which a stiff diaphragm *21* is supported by springs *20*. Contact springs *22* carry the electrodes, four on each side, which press against the opposite faces of the diaphragm. Pivoted covers *14* and *17* protect the inner parts.

The circuits are shown in Fig. 3. The middle point of the divided battery is connected through the primary *33* to the diaphragm *21*, which may be of carbon. The contacts *22* on one side are connected in parallel through wires *36* and



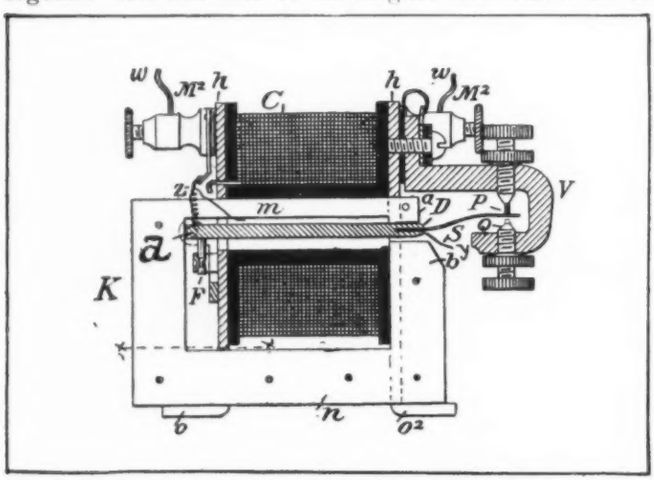
749,448—TELEPHONE TRANSMITTER.

37 to the negative side of the battery *30*, while the contacts on the other side are similarly connected by wires *34* and *35* to the positive side of battery *31*.

As the contacts on one side are pressed upon more strongly, the pressure upon those on the other side is relaxed. The result is that the balance of forces is disturbed, and current waves are set up which are alternately positive and negative. It does not appear that the amplitude of change, the rate of change or the volume of current is any greater than in a plain, everyday one-way transmitter, and as the latter produces reversals in the secondary, it is hard to discern any novel merit in the case.

749,399.—Alternating current relay. G. W. Pickard.

This is a relay for alternating currents, having one salient feature of novelty, which is that the armature is included together with one limb of the magnet core within the coil.



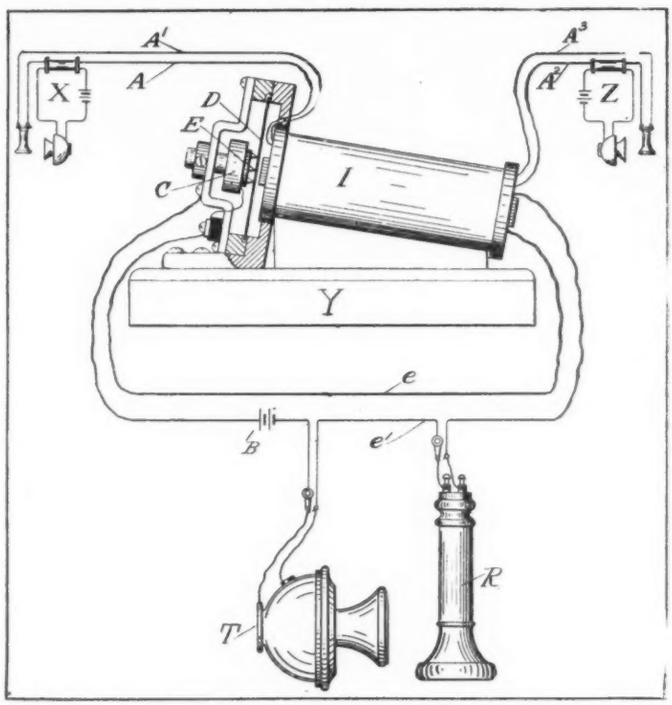
749,399—ALTERNATING CURRENT RELAY.

The result is that the armature and limb so inclosed are rendered at the same polarity, whatever the direction of current, at any given instant, the armature being thereby repelled from said limb and attracted to the other.

In the drawing *C* is the coil or solenoid, having within it one limb *n* of the core *K*, and also the armature *D*, pivoted at *d* and provided with a retracting spring *f*. The armature carries a contact *S* normally resting against the upper point *P* in the yoke *V*, but drawn down against the point *Q* when current passes. The specification sets forth that this relay is for use especially in composite systems for simultaneous telegraphy and telephony. It is shown tapped off from a telegraph line in a branch with a condenser. It is to be conceived, however, that it would be quite suitable for use in those common battery party-line telephone systems, wherein an alternating current relay closes the ringer circuit.

749,481.—Telephonic repeater. M. Gally.

This is a telephonic relay in which the induction coil is combined with the receiving magnet of the relay. In the figure *I* is the induction coil, having a single primary and a double secondary, one secondary connected to line *A-A'* and the other to line *A2, A3*. Primary *e, e'* includes the



749,481—TELEPHONE REPEATER.

battery *B* and goes to the button transmitter *C, E*. Impulses over one line affect the core of *I* to move the diaphragm *D* and so affect the button *E*, and by changing resistance in the primary repeat into one or both of the secondary circuits.

TELEPHONES IN AUSTRALIA.

The *Australian Mining Standard* states that the report of the Electrical Board of the Commonwealth on the question of interference by overhead systems of electric tramways with telephone lines has been handed to the Postmaster-General. The report deals with not only the existing interference with the telephone system at Bendigo, but the whole question of the protection of the lines from injury by any other lines or works. Various methods are suggested for reducing this disturbance, but the only complete cure is reported to be the adoption of the metallic telephone system. Leakage and stray currents also gave trouble. To prevent this, it is suggested that all electric lines for lighting and tramway service should be substantially constructed and efficiently maintained, and the board recommends as a basis for further prevention of such leakages, that the Board of Trade's regulations on the subject should be adopted. It is suggested that these regulations should be printed, and the representatives of tramways and other authorities invited to peruse them and offer suggestions.—*London Electrician.*

Independent Telephone Convention of Nebraska.

E. C. Hansen, Secretary.

Pursuant to call of the secretary, the fourth annual meeting of the Independent Telephone Association of the State of Nebraska met in the banquet hall of the Lindell Hotel, Lincoln, Nebraska, January 18, at 2:30 p. m.

President I. D. Clark called the convention to order and introduced Mayor George H. Adams of Lincoln. In a very happy manner the mayor welcomed the delegates present with the apology that it was easier to talk than to make an address. He admitted that he was talking to business men whose rights were easy to recognize in the capitol city, because all of the delegates had more than a common interest in Lincoln. The mayor said that his audience were part owners of the public buildings and were entitled more especially to the freedom of the streets of Lincoln than they were to other except their home towns. A fitting tribute was paid to the telephone, primarily because it was responsible for the building of society and the interchange of business sentiment throughout the state. The speaker reviewed methods of the past and prophesied what the future held in store for all good citizens, of which none were better than telephone men.

At the conclusion of the mayor's remarks President Clark called upon Judge A. E. Gantt, of Falls City, to respond to the mayor's welcome. The Judge, on behalf of the attending delegates, stated that they had been hammering at Lincoln's doors for admittance with Independent telephone lines for a long time, and thanked the mayor for his assurance that the Independent appeal should have been recognized at a much earlier date. Referring to the Independent plant at Lincoln, the Judge believed that the money had been well invested. He entered briefly into a discussion of rates as compared to the rates charged by the Bell company, declaring that Independent apparatus was good as a rule, and all Independents were thankful for the influence the Commercial Club of Lincoln had wielded in assisting Independent apparatus to reach Lincoln, thus giving the exchange operator the privilege to talk back to his home over Independent lines. He assured the mayor that the delegates present would not require an additional police force during their brief stay, and that the mayor's hospitality was appreciated.

Following Judge Gantt, the annual report of Secretary E. C. Hansen of Fairbury was read. Owing to a very disastrous fire at Fairbury, the records of the secretary of the association had been lost; consequently, aside from an explanation of this loss, the secretary had little to offer. The convention accepted the secretary's report, approving it. At the conclusion of this report, on behalf of the exhibiting manufacturers and supply dealers, the convention was invited to participate in a smoker to be held at 8:00 o'clock at the Commercial Club's rooms later in the evening. Upon invitation of the secretary, the following companies renewed their membership in the association:

Citizens' Telephone Company	Fullerton
Lincoln Telephone Company	Lincoln
York County Telephone Company	York
Fremont Telephone Company	Fremont
Fillmore Telephone Company	Geneva
Saline Telephone Company	Saline
Platte County Telephone Company	Columbus
Stella Telephone Company	Stella
Ord Independent Telephone Company	Ord
Camp Dewey Telephone Company	Creighton
Ashland Independent Telephone Company	Ashland
Wayne Independent Telephone Company	Wayne
Dewitt Telephone Company	Dewitt
Bradshaw Telephone Company	Bradshaw
Douglas County Telephone Company	Valley
Arlington Telephone Company	Arlington
Falls City Telephone Company	Falls City
Auburn Telephone Company	Auburn
Nebraska City Telephone Company	Nebraska City
Hooper Telephone Company	Hooper
Palmyra Telephone Company	Palmyra
Plattsmouth Telephone Company	Plattsmouth
Golden Rod Telephone Company	Wahoo
Home Telephone Company	Papillion
Fairbury Telephone Company	Fairbury
Pawnee Telephone Company	Pawnee City
Sioux City & Black Hills Telephone Company	Ponca
Wray Telephone Company	Wray, Colo.

H. J. Minhinnick, construction engineer for the General Engineering Company, Chicago, spoke on the subject of "Cables and Terminals." The nature of Mr. Minhinnick's subject was extemporaneous. He believed that no part of the telephone system has been handled more mysteriously than the cables and terminals. Cable manufacturers, he declared, wanted the operator to adhere to fifteen-year-old specifications. As the engineer for his company, he invited delegates to visit the installation of cable and study the methods of handling it. He especially emphasized the fact that a heavy sheath was always preferable. At the conclusion of Mr. Minhinnick's address a vote of thanks was tendered to him by the convention, which then adjourned to meet at 9:30 a. m., January 19.

TUESDAY'S SESSION.

President Clark called the meeting to order at 10:30 a. m. and introduced Mr. W. H. Daubendick of Dewitt, who read the paper entitled "Farm Lines—The Construction of Same and the Proper Rates," which follows:

Farmers' lines and their construction is a subject that has been discussed. Read whatever telephone journal you will; attend whatever convention you may; you will notice this topic is given due consideration. And you will notice, also, that the debators come to no agreement save on the one point that the establishment and proper maintenance of rural lines is paramount to the unqualified success of the Independent enterprise.

One operator says, "Build ground lines and put ten to eighteen telephones on the one line and charge $15 to $18 per year."

Another says, "Make the lines metallic, put ten and no more on one line and charge $18 to $24."

Still another, "Let the farmers organize mutual companies." The person offering this suggestion partially restores the confidence of his breathless auditors by continuing: "First, though, give them a course of instruction in the art of building and maintaining and afterwards provide connection with your system for them at as low a figure as possible."

As many other plans are suggested as there are suggestors and we need but glance at the entire list to discover the inability of anyone else to set forth our ideas of farm line establishment, construction and maintenance.

You will appreciate, then, the effort necessary upon the part of one who fain would bring everybody to believe as he does, yet realize how foolish and utterly impossible is the task. Every Independent telephone exchange, with the possible exception of the city exchanges, has at some time in its early existence had this question of farm line establishments to confront. The demand must be met, and the advisability of giving it prompt attention is characteristic of Independent progress.

It is not until actual construction begins that the discussion is provoked and our paths diverge. It is true that local conditions

sometimes justify these differences of opinion, but more often I fear we are prejudiced by matters financial. Cheap, unserviceable lines are the inevitable result.

It is unnecessary and unbusinesslike for a company to scatter its capital over two or three counties, simply to get possession of the territory at the expense of good paying service.

I would rather invest in one farmer line, substantially built and giving good service at a fair price, than in a dozen "rattle-trap" lines, giving miserable service at a larger figure.

The building of bad lines is not economy. Quite to the contrary it is extravagance in the extreme, for sooner or later, the farmer who is educating himself in regard to these matters, which so deeply concern him, will demand better service, and your company, as many others have done, will face the problem of reconstruction.

Experience has taught us that the farmer does not merit the opinion ofttimes formed of him, that he is continually demanding something for nothing. At the same time he is not so gifted with the spirit of generosity that he is willing to give something for nothing.

Heavily loaded ground lines, with their resulting cross talk and line disturbance may for a time appease the demand of the farmer, but as soon as the novelty of having a telephone wears off, and the practical utility of the service presents itself, he begins unconsciously or otherwise to acquaint himself with the quality of the service as compared with that of others.

If his neighbor has better service he is not the last one to discover the fact and although it be the most expensive he becomes dissatisfied and disagreeable.

It is this feature that managers have to guard against, for one dissatisfied subscriber leavens the whole loaf, and he can do more damage to our enterprise than a dozen that are satisfied will repair.

Perhaps you would care to know my ideas of farm line construction, but first let me tell you upon what authority I base my opinion.

Some two years ago the Dewitt Telephone Company was organized with a capital stock of $100,000. We were ambitious, but misguided. Other companies, we were informed, were making a success of grounded lines. Why shouldn't we build grounded lines and cover twice the territory? We built them, using fair, but not the best construction. They gave admirable results for a time but our business grew and we were compelled to parallel the original grounded line with another and still another, and our success in giving good service can be imagined. Cross-talk existed everyhere without ceasing. For a time it was appreciated, for when on Sunday afternoon, the operator and manger were at home reading their Bibles, a stalwart young granger and his flaxen-haired darling were, by virtue of a previous appointment, whispering their love pleadings from one line to the other without the aid of plug or switch.

It was magnificent for a time, but as our toll connections increased there was a demand among the farmers for not only good local service, but good toll connection uninterrupted by cross-talk, and kindred troubles. We were not long in finding out that this dissatisfaction increased and we made partial atonement for our sins by vowing never to build another grounded line.

We have since built metallic lines, using heavy cedar poles and BB wire No. 12 guage. The corners were well anchored and the general construction approaches our ideals of perfection for a farmer line. Ten 5-bar generator, 1600 ohm, bridging instruments have been placed on a line and the service is excellent so far as party line service can be made.

There is, of course, that party line feature yet to be eliminated and we anticipate a demand on the part of the farmer for individual service if such can be proven practical.

The selective lock-out system, if it stands the test, will no doubt prove to be the solution of private service on party lines.

These views, whether they are of any value or not, were gleaned from actual experience. Our experience, no doubt, has been the experience of other companies and all must sooner or later come to realize the necessity of well constructed and metallic lines for rural use.

There is very little excuse for newly organized companies to make mistakes. The experience of their older contemporaries should be given careful consideration.

This one thought comes to me in regard to the furtherance of our farmer business by interesting them in our enterprise: The influential farmer, who is the proud owner of a farm worth $50 or $60 per acre, which has been acquired by thrift and industry and careful management would indeed be a good partner in the telephone business and a few shares of stock, well distributed will greatly aid in making rural business a lasting success.

At the conclusion of this paper, Mr. Daubendick was asked to name the rates his company charged at Dewitt in supplying farmer service. He informed the convention that for grounded line service he charged $1.00 and for metallic line service $1.50. He declared that it was a difficult matter to interest farmers in making the change from grounded line to metallic line service, because some of the farmers do not object to cross-talk. He did not believe that it was practicable to give good service with more than ten parties on the line and spoke from experience that it was not practical to supply good service with grounded lines. Following the general discussion of Mr. Daubendick's paper, a number of puzzling problems were brought out for the opinions of the members, which threw the convention into a sort of an experience meeting, the several delegates giving what solution they had arrived at to remedy the difficulties that had arisen in the conduct of business. Many helpful suggestions for bettering local service were given. The general opinion of all was that party lines should be replaced with individual circuits as fast as possble and that the shares of stock be distributed among the patrons of the service as far as practicable.

Following this discussion, A. E. Gantt of Falls City addressed the convention on the subject of "Toll Lines and the Standardization of Rates." He expressed the belief that some uniformity should exist throughout the state and that a certain scale should be accepted by all of the companies interested in the toll service, that would become an important factor in the betterment of the whole system of Independent lines. An interesting discussion followed, which was participated in by many of the leading operators of the state. Shortly before noon the conventon adjourned to the Lincoln Telephone Company's new building, where two photographs of the members were taken.

AFTERNOON SESSION.

More routine work was transacted at the afternoon meeting than had been disposed of at any earlier session. Resolutions, motions and election of officers were sandwiched in between papers on technical themes.

W. J. Courtright of Fremont discussed the "Legal Relations of Telephone Companies," giving the proper solution to many points that were hazy to the rank and file of the membership of the association in matters relating to the "hello girl" and the law. He followed this with a set of resolutions that was in the nature of a demand on the Omaha merchants and the Omaha Commercial Club that they should recognize the Independent company, and organize one in that city. The text of the resolution follows:

"To the Business Men of Omaha and to the Omaha Commercial Club: The Nebraska association of Independent telephone companies in annual session assembled send you greeting and call your attention to the following facts:

"That in the United States to-day the Independent telephones in actual use exceed the number of Bell telephones by more than fifty per cent.

"That Nebraska is just getting under headway in the movement.

"That the reasons why the Independent companies can afford to give lower rates than the Bell companies are well established and indisputable facts.

"That the smaller towns, your best customers, are using the Independent telephones almost exclusively.

"That in your competitive cities of Chicago, Detroit, St. Paul, Minneapolis, Sioux City, Des Moines, Council Bluffs, Cedar Rapids, Lincoln, Fremont, Grand Island, Kearney, Beatrice, Nebraska City, Plattsmouth, Columbus, Topeka, St. Joe, Kansas City and many others, there are Independent systems, now built or building, and these cities are rapidly being connected with toll lines with a thousand towns in your trade territory."

The resolution offered by Mr. Courtright was unanimously adopted.

A. N. Munn, of Nebraska City, followed with a paper on the subject of "Toll Line Standards and Uniformity of Construction." His argument was that there should be certain degrees of uniformity in the construction of all long distance lines, so that the facility of the service might be increased. In the discussion that followed the paper, H. J. Minhinnick added some helpful suggestions.

For the proper adjustment of rates, a clearing house committee was recommended, whereby the proper fee for each Independent company might be decided when the talk was carried on over a number of their long distance wires. These toll lines should be systematically inspected by a person em-

ployed for that purpose, who will have authority to make necessary alterations in the service to secure the best results. The inspector was provided for by a resolution by Mr. Munn.

On motion, the president was empowered to appoint a toll line committee. He named Pollock of Plattsmouth, Munn of Nebraska City, Crist of Fremont, Killarny of Auburn, Bell of York and Gantt of Falls City. The president, vice-president and secretary were to be members ex-officio.

Officers were elected as follows: President, I. D. Clark, of Papillion; vice-president, J. E. Adamson, Broken Bow; secretary and treasurer, E. C. Hansen, of Fairbury.

The next annual convention will be held at Omaha, the date to be fixed by the officers of the association.

The following manufacturers and supply houses were represented, some making very creditable displays:

American Electric Fuse Company, Chicago.—Geo. W. Rodomer.

American Electric Telephone Company, Chicago.—S. J. Bear.

Chicago Telephone Supply Company, Elkhart, Indiana.—George A. Briggs and George Brown.

Electric Appliance Company, Chicago.—Leon Bly.

Ericsson Telephone Company, New York.—C. M. McNeill.

C. J. Huebel Company, Menominee, Michigan.—C. J. Huebel.

Illinois Electric Company, Chicago.—Malcolm MacNeill, Jr.

International Telephone Manufacturing Company, Chicago.—Thomas G. Seymour.

Kellogg Switchboard & Supply Company, Chicago.—W. R. Hind and Harry M. Faris.

Stromberg-Carlson Telephone Manufacturing Company, Chicago.—C. W. Bartlett, Sr.

Telephony Publishing Company, Chicago.—Ed. J. Mock.

Vought-Berger Company, La Crosse, Wisconsin.—M. I. Berger and Geo. F. Keefer.

Western Electrical Company, Omaha.—Lee G. Lowry and C. W. Bartlett, Jr.

THE NEBRASKA TOLL LINE ASSOCIATION.

The Nebraska Toll Line Association met in the banquet hall of the Lindell Hotel, Lincoln, Nebraska, at 4:00 p. m., January 18, 1904, and adjourned to meet again at 9:30 a. m. on the following morning.

President I. D. Clark called the meeting to order. J. Howard Heine was elected secretary pro tem. On motion, the president appointed the following nomination committee to suggest list of officers for the coming year: W. J. Courtright, Fremont; O. M. Thorp, Wahoo; A. R. Dodson, Valley. The committee composed of the above mentioned gentlemen recommended as follows: E. C. Hansen, Fairbury, president; J. Howard Heine, Hooper, vice-president; W. D. Crist, Fremont, secretary and auditor.

A. M. Munn, Nebraska City; O. M. Thorp, Wahoo; T. H. Pollock, Plattsmouth; J. C. Killarney, Auburn, and A. E. Gantt, Falls City, were named as rate committeemen for the year.

G. T. Everett, Columbus; A. R. Dodson, Valley, and H. C. Vail, Arlington, were appointed to act as membership committee. The report of the membership committee recommended the acceptance of the Citizens' Telephone Company of Fullerton as a member of the association. The recommendation was adopted.

The Nebraska Toll Line Association is supplied with blanks and other printed forms to successfully gather and compile all necessary data. A large map of the state has been provided and the various toll line interests have been indicated on this map. The rate committee through its chairman recommended that one cent per mile be charged for toll messages up to twenty-five miles, local conditions to govern in all cases. Two cents was recommended for each additional mile. The association authorized the printing of the report of the rate committee.

To the casual observer it would seem that Independent toll line interests in Nebraska were in a most satisfactory condition. The officers recognize the importance of successful toll line operation and have successfully met a great many of the problems that are still proving obstacles to Independent progress in other states. The Lincoln Telephone Company promised the toll line association that it would build a number of long distance lines out of Lincoln and connect with Independent exchanges. These lines will be built in the best possible manner with a view to give the best quality of service to the public. Standardization of construction will be followed as closely as local conditions will warrant. It is generally believed that within a year the Independent companies of Nebraska will be in position to offer service to almost every part of the state.

IOWA INDEPENDENT CONVENTION.

The Western Iowa Independent Telephone Association recently held its second annual meeting at the Grand Hotel in Council Bluffs. The principal business was a discussion of plans to secure Independent connection with Council Bluffs, the topic being: "How can we persuade the people of Council Bluffs to allow 10,000 telephone subscribers in southwestern Iowa to talk with them?" The discussion was opened by H. W. Cutshall of Shelby, who said in part:

"When a merchant in a town tributary to Council Bluffs takes up his telephone receiver and calls for Council Bluffs and is informed that there is no connection with this town, if he is in a hurry for his order he will naturally ask for connection with Sioux City, Des Moines or some other convenient jobbing point, and Council Bluffs will thus lose much trade. Of course, many of the towns have the Bell toll stations, but this necessitates the customer running over to the booth every time he wants to call, and waiting around sometimes for half an hour before he gets the party. In a few of the towns the Bell company has exchanges, but in most towns where there are both the Independent telephones are vastly in the majority."

M. A. Reed discussed the subject "How can we best secure the construction of long-distance copper metallic toll lines in southwestern Iowa?" and P. C. Holdoegel, "Rules for rural lines and how to enforce them."

It was unanimously decided to call the organization the Southwestern instead of the Western Iowa Independent Telephone Association, and the officers elected for the ensuing year were as follows: President, H. A. Kinrey, Woodbine; vice-president, P. C. Holdoegel, Rockwell City; secretary, J. F. Glenn, Denison; treasurer, A. T. Whittle, Harlan; executive committee, H. W. Cutshall, W. B. Swaney, M. A. Reed and E. E. Piper.

THE MICHIGAN BELL SALE.

In a statement issued by N. W. Harris & Company, purchasers of the Michigan Telephone Company, at the recent auction sale, attention is called to the fact that the company earned $1,500,000 last year. The company's plant cost $11,000,000 to build and its bonded debt was $5,000,000 with a capital of a like amount and a floating debt of $2,782,000. Thus by the sale there has been eliminated $7,782,000 in stock and debts. This should be a lasting lesson to all investors to let Bell stock severely alone. The entire loss in this last Bell failure was borne by the stockholders, who lost every dollar invested. Bell securities are now spoken of as "insecurities" and investors are buying Independent stock and bonds which pay well and are safe.

Measured Telephone Service

HAROLD D. STROUD

-CENT service is proving to be practical and profitable. It is sensible and argues against the flat rate, especially in the larger cities. It should pave the way to a clear understanding of rates in the smaller cities.

Looking at the telephone service question from the various standpoints of all concerned, the student of conditions, if careful to ascertain facts and make truthful deductions, can arrive at no other conclusion than that the message rate method of handling the traffic of a telephone plant is the only natural way. If he is possessed of reasonable foresight, after taking time to investigate, he will readily see where his interests and those of his company lie.

For the purpose of illustrating the advantages of measured service, the writer will take up the question from different points of view, starting first with the traffic or service department.

TRAFFIC.

It is notable that in several Independent plants the total average in twenty-four hours for every line in service is twenty calls per line. This is on the flat-rate service, where subscribers do not hesitate to use the telephone for every unnecessary purpose, and give the telephone service away to any and all as freely as they would matches, not thinking that they are barring their own doorway.

Instances are not uncommon where a subscriber complains that others could not get his telephone; that they always got the "busyback" when they called. As a rule this invariably happens when subscriber knows that his telephone was not in use. This kind of customer usually becomes so troublesome to a company that traffic observation is required. For long periods these observations are made on the line until a complete set of data is gathered. A test of this nature showed that the subscriber averaged on a ten days' trial sixty-five outgoing calls per day and over seventy-five incoming calls. About 20 per cent of the outgoing calls were made by employes on their personal account and for their personal business or pleasure. Over fifty per cent were calls such as they would hesitate to pay for at a nickel per call, and of the incoming calls over forty per cent were for some person who was not in the immediate vicinity of the telephone and had to be called to it. The line had to be held on an average of twenty-five seconds for the party wanted. This means the holding of both telephones. When the company answered this subscriber's complaint by saying to him that he was wasting the service and trying to do too much on one line, and showed to him conclusively that he could not eat all the cake and keep it too, he said that he knew an effort was being made to hold him up for another line!

Such a case is almost incurable, but it goes to show the false light in which the company is often placed and what a means of effecting a check on the traffic such as metered or coin service would give, even if it was graduated down to one cent a call, as could be done by the use of slugs where the traffic was heavy. Slugs or tokens used for this purpose should be made especially for the company and of a character not easily counterfeited. Whenever a line ran over a certain number of calls per day the company could put in an auxiliary line, which would pay them rather than have the measured service subscribers who were trying to call get the "busyback" and possibly forget to make the call, which would mean a loss to the company directly.

In Chicago a very good and successful plan has been introduced. When it is found that the traffic on a line is abnormal a solicitor is sent to the subscriber empowered to offer an auxiliary nickel telephone, the company agreeing to put all incoming calls on this telephone unless busy—and then on the regular flat rate line—thus leaving the flat rate line free for outgoing service. This plan offers practically double-track service. For the additional line the subscriber guarantees from ten to thirty cents per day, according to the number of subscribers on the line. Ten cents puts him on a ten-party line with non-selective ringing; twenty cents per day gives him a two-party selective instrument; and thirty cents per day offers him a single line with no other party on it. If he has occasion to use this instrument enough each day to meet his guaranty, it is because his business required it, or else he was paying for his lack of regulation in not compelling his employes to refrain from using the flat rate line when it was needed for his business.

The transient public are, as a rule, compelled to use the nickel telephone if they want to make a call. In most cases the free line is concealed behind a counter or desk, and the pay line is placed where the public can see it.

The effect on the traffic after adopting this plan was wonderful, and where measured rate lines became so very busy that an operator could not handle her full quota of calls she was relieved of some of them and there was the consolation that the company was still doing well.

A high average of calls per line means a high average of "busyback" calls, which also means that the quality of service (as judged by the subscribers) is good in inverse proportion.

The limit of one operator's capacity is the number of lines she can handle without neglecting any of them—which means four-second answering and prompt clearing out. Therefore, if we take a plant entirely flat rate, having 9,000 subscribers, telephones averaging twenty completed calls per telephone, we have a total of 180,000 calls per day. Good flat rate operating on multiple board, with six movements per connection to be made by the operator, is 250 connections per hour. To handle this traffic represents a value of 720 operator hours, or ninety operators working eight hours with an even load. As some eighty-five per cent of the calls are handled in the period of eight hours, and twelve per cent of the traffic is to be handled in the busiest hour, about 110 operators must be carried on the pay-rolls to do the work with economical arrangement of the force. If the average revenues per line per annum is $50, we have 65,700,000 calls for $450,000, or 145 calls for $1.00.

For comparison let us take this same system and convert it into a measured service plant. The first thing that we will notice is that the traffic falls to between seven and twelve calls per line—for comparative purposes we will call it ten—cutting the flat rate traffic in half. This gives us 90,000 calls per day. With the small percentage of "busyback" calls which we would have, say six per cent, and with the most improved devices for handling the payment or collection at the subscriber's station, the operators would average 240 calls per hour. This, of course, could not be done on the

request plan of working substation charging appliances when the operators asks the subscriber to pull levers. On lever appliances an operator who can handle 100 calls per hour and get all coin signals correctly is doing well. On measured service, then, a system of 9,000 telephones, each averaging ten calls per day, the operating would represent a value of 360 operator hours, or forty-five operators working eight hours on an even load. About fifty-five operators would do the work in this system, as against 110 on a flat rate system with the same number of telephones. If each telephone averaged ten calls per day at two cents per call, the company would derive an average yearly revenue of $73 per telephone, or $675,000, as against $450,000 on the flat rate basis, to say nothing of the decrease in cost of operating and the numerous other savings which enter into the further consideration of the subject.

Efficiency of Troublemen

FRED J. HEAVENS

In the operation of telephone plants the efficiency of trouble-men is an important factor to which due consideration is not always given.

To maintain a telephone plant successfully and economically great care should be exercised in the selection of trouble-men for either line, instrument of switchboard. These men are virtually the backbone of these important subdivisions of telephony. It is amazing to know of the great number of trouble-men, who, when sent out to clear a certain case of trouble, go to the telephone, juggle the transmitter or take it apart; pour out the battery solution (if system is local talking) and renew it; rattle the hook a few times and then expect the trouble to be cleared. In reality the trouble may have been in the generator or ringers. This class of trouble-men may be found looking for transmitter trouble in a cable box. This kind of trouble-man does not know why it is that when you speak into a transmitter the same sounds may be heard in a receiver. If you ask him to draw a rough sketch of the circuits in the instrument which he has been keeping in "repair" for months he cannot do it.

So is it not absurd for a trouble-man to try to clear trouble in an instrument before learning its operation and circuits? I have ascertained through questioning innumerable so-called "trouble-men" that they do not know the real principle of telephony and a blue-print of the circuits of the instrument or apparatus in use at the exchange where they are employed looks like so much "Greek" to them. I believe I am safe in saying that this class of trouble-men comprises about seventy-five per cent of the total.

What is the inevitable result? Increased cost of maintenance through time wasted by trouble-men in trying to "discover" the defect; dissatisfaction of subscriber through delay in the repair of his telephone and consequently increased length of time in which his telephone is rendered inoperative, in a great many instances necessitating a rebate on rental charges; deterioration of plant owing to poor repairs; loss of subscribers, and sometimes the total failure of the telephone company.

In plants of this kind the superintendent of maintenance, who, as well as the heads of other departments, sometimes receives his appointment through "pull" and not by reason of ability. Such officials will say that the trouble-men are evidently good, because they are always busy, and then because the trouble is not being kept cleared decides to add a few more men to the force. Such a superintendent does not make inquiry as to the fitness of his men, but goes on blindly spending dollar after dollar in an attempt to keep the trouble clear, when, if he paid more attention to his men's qualifications than their brawn this needless expenditure would cease.

What effect does this have upon the trouble-man? He sees that merely through the fact of his having "cleared" trouble for some telephone company he can get a position with another and not because he knows the "whys" of things telephonic.

Now if the maintenance department would have all applicants for positions go through a simple examination relative to the general troubles likely to be encountered the applicant would soon see the importance of keeping pace with the times. He can very easily inform himself by subscribing for one or two of the magazines that are devoted to the subject. These magazines contain articles of inestimable value to one who will carefully read them. There are also correspondence schools of high repute which have excellent telephonic courses at very reasonable terms.

It is not uncommon to hear complaints among the men that the incompetent ones sometimes receive the same salary that the competent ones do. If every man before being employed was examined as to capability and only the capable ones were employed, then each employe would be worth more and the company could afford to pay him more because of being able to reduce the force and at the same time better the service.

As soon as the telephone companies realize that to have good service they must have good trouble-men, just so soon will their revenues increase. By means of an "educational test" the efficiency of the trouble-man, who at present is woefully lacking, will also be most satisfactorily increased.

TELEPHONY FOR 1903 IN ENGLAND.

The editor of the London Electrician in his resume of electrical progress in the United Kingdom for 1903, has this to say of telephonic development:

In telephony the central battery exchange system is extending, but a paper read before the Institution of Electrical Engineers advocating a central battery system applied to a divided multiple switchboard met with little sympathy. The post office telephone system in London is increasing in magnitude, and two new exchanges have been opened—in Mayfair and at Chiswick. The metropolitan system of the National Telephone Company continues side by side with that of the post office, and the arrangements for intercommunication between the two systems work satisfactorily. Small municipal exchanges have been opened in Portsmouth, Swansea and Brighton. Hull has commenced the erection of a municipal telephone exchange, but is rather late, as its telephone license expires in 1911; in order to compete successfully with the National company the corporation gave notice to terminate the agreement under which the company had been permitted to lay its underground lines, and this led to a law suit, resulting, however, in favor of the corporation. The accounts of the Glasgow municipal telephone department were severely criticised on all sides, it being contended that the undertaking was being run at a considerable loss, and fault being found with the allocation of certain expenses (such as canvassing) to capital account. In addition to the municipal exchanges already mentioned, and the Tunbridge Wells exchange, seven other municipal telephone licenses have been granted; but we believe that no progress has yet been made towards building the actual exchanges, although some of these licenses expire in 1911. A telephone service between England and Belgium is now in operation, and the telephone convention between this country and France was ratified by the senate on December 30. Mention may also be made of successful experiments in Germany and America with distributed inductance in long telephone lines.

Surely the development of the telephone industry in the United Kingdom has not been marked. Our English cousins might find much to emulate in the United States.

A New Financial Institution

THE UNITED STATES TRUST AND SAVINGS BANK, CHICAGO

Ellsworth B. Overshiner, president and treasurer of the Swedish-American Telephone Company, Chicago, has been the most prominent figure in the successful promotion of a new financial institution, with a capital of $1,250,000. *The Economist,* one of the leading financial journals of the country, in a recent issue says:

"Prominent people are engaged in the organization of a new bank and trust company with the name of the United States Trust and Savings bank, capital stock and surplus $1,250,000. Some of the stockholders and those actively engaged in the organization are: D. G. Reid of New York, vice president Liberty National Bank, chairman of the executive board of the Rock Island system of railways and member of the executive board of the United States Steel Corporation; William George of Aurora, Ill., president Second National Bank of Aurora, Ill., president of the Bankers' Association of Illinois and vice president of the American Bankers' Association; A. C. Bird of Chicago, vice president of the Gould system of railways; William H. Harper of Chicago, former manager and treasurer of the Chicago and Pacific Elevator Company and author of the famous high license law; L. E. Ingalls, Chicago, capitalist; Robert L. Henry of Chicago, capitalist; United States Senator A. J. Hopkins of Aurora; John McLaren, vice president of the Union National Bank and ex-president Hide and Leather National Bank, Chicago; Ellsworth B. Overshiner of Chicago, president and treasurer of the Swedish-American Telephone Company; Edward C. Young of Chicago, director of the Belding Brothers & Co., silk manufacturers; Edward L. Roberts of E. L. Roberts & Co., Chicago, wholesale sash, door and lumber dealers; Thomas B. Pierce, president of the Union National Bank of Kewanee, Ill.

ELLSWORTH B. OVERSHINER.

"Other names of business men connected with the new organization are a sufficient guarantee of its high character and excellent management.

"The new bank and trust company is completing its organization under the Illinois state laws. Like the national banking act, the Illinois statute provides for official examination and for otherwise safeguarding the interests of both shareholders and depositors.

"The company has secured for its banking rooms the commodious and centrally located premises at the corner of Dearborn and Washington streets, Chicago, occupied by the Merchants' Loan and Trust Company during a period of twenty years and already completely equipped with elegant and modern banking fixtures. Perhaps no better situation geographically could have been selected in the city.

"The policy of the new bank will be both conservative and progressive, the intention being to cover the field in a general banking and trust business as that field has been enlarged by the events and developments of the last few years in the United States, the fact being recognized that the business standard and activities of a dozen years ago have given place to a new set applicable to new conditions.

"The prosperity and profitableness of first-class banks and trust companies in Chicago is proverbial. The prime reason, aside from the competent management, why the stocks of these institutions are selling to-day at from $200 to $650 per share, par being $100, is the little understood fact that the per capita banking capital of Chicago is much less than that of any of the eight principal cities in the United States.

"In view of the foregoing, and the further fact that no less than 13 prominent banks in Chicago have gone out of existence during the last few years, mainly through the prevalent tendency for consolidation, it is easily apparent that there is not only ample room for the United States Trust and Savings Bank, but an exceptional demand for such increased banking facilities to meet the requirements of this leading business center.

"The large representation of strong banking institutions located throughout the middle west in the stockholders' list is one of the strongest guarantees of its solidity.

"It is understood that the stockholders have secured as the president of the new financial institution Mr. William George, now president of the Second National Bank of Aurora. Mr. George is recognized in financial circles as one of the most successful and sagacious bankers of the country. This estimate is further confirmed by the fact that he is at this time president of the Bankers' Association of Illinois and vice president of the American Bankers' Association. Mr. George is also largely engaged in the live stock business and farming in Kane county, Ill., is in the prime of life and would bring to the discharge of his duties qualities of the very highest class, and an experience as a practical banker and business man which is inestimable.

"The stock subscriptions have been and are being made to Mr. Ellsworth B. Overshiner, 618 Woman's Temple, care Hopkins, Dolph, Peffers & Hopkins."

The following is a list of subscribers who have taken stock in the "United States Trust and Savings Bank":

E. B. Overshiner, president Swedish-American Telephone Company, Chicago.
William George, Aurora, Ill.
Daniel G. Reid, New York.
J. L. Kestner, Chicago.
Robert L. Henry, Chicago.
Senator A. J. Hopkins, Aurora, Ill.
John McLauren, Chicago.
Edward C. Young, Chicago.
Edward L. Roberts, Chicago.
Thomas B. Pierce, president Union National Bank, Kewanee, Ill.
Alfred Stromberg, president Stromberg-Carlson Telephone Manufacturing Company, Chicago.
John W. Calaway, president Citizens' Exchange Bank, Elwood, Ind.
P. C. Burns, president American Electric Telephone Company, Chicago.
Victor E. Seiter, president Logansport State Bank, Chicago.
W. E. Doolittle, president Sterling Electric Company, LaFayette, Ind.
B. F. Homer, president Hodge & Homer Hardware Co., Chicago.
C. H. North, president North Electric Company, Cleveland, Ohio.
John M. Duryee, Prairie State Bank, Chicago.
Henry W. Shafer, president International Telephone Manufacturing Company, Chicago.
Oliver B. Frazier, president Elwood State Bank, Elwood, Ind.
George W. Briggs, president Chicago Telephone Supply Company, Elkhart, Ind.
Frank E. Bowman, assistant cashier Second National Bank, Pittsburg, Pa.
W. O. Meissner, president Acme Electric Company, Chicago.
Frank McPherson, cashier Levels & Company's Bank, Chicago.
Chas. W. Farr, president Farr Telephone and Construction Supply Company, Chicago.
Frank B. Cook, Chicago.
T. H. Williams, Chicago.
James E. Bullock, president Malleable Iron Company, Chicago.
Frank G. Jones, president American Electric Fuse Company, Chicago.
Leserman Bros., Chicago.
Barber & Brailey, Central Telephone Construction Company, Toledo, Ohio, Louisville, Ky., Kansas City, Mo., and Utica, N. Y.
C. E. Wheeland, of Mueller, Platt & Wheeland Company, president Bank of Montpelier, Idaho, Decatur, Ill.
W. H. Crumb, president W. H. Crumb & Company, Chicago.
H. G. Callaway, cashier Citizens' Exchange Bank, Elwood, Ind.
Joseph P. Tracy, traffic manager National Salt Company, Chicago.
D. A. Middleton, treasurer Consolidated Ubero Plantation Company, Boston, Mass.
Chas. D. Cockerill, Greene County Telephone Company, Jefferson, Iowa.
W. A. Hamilton, manager Mutual Life Insurance Company, Terre Haute, Ind.
Geo. H. Bandy, president Hawkeye Telephone Company, Des Moines, Iowa.
W. E. Brice, president Star Petroleum Company, Beaumont, Tex.
Dr. G. W. Greaves, president Spencer Telephone Company, Spencer, Iowa.
M. D. Gibbs, banker, Alton, Iowa.
M. V. Shipley, president Central Iowa Telephone Company, Iowa Falls, Iowa.
J. M. Overshiner, Elwood, Ind.
F. M. Ferguson, Grinnell, Iowa.
E. G. Cushing, wholesale mouldings, Chicago.
J. H. Bradt, president Central Mutual Telephone Company, Rockwell City, Iowa.
J. R. Mulvane, president Bank of Topeka, Topeka, Kans.
Frank D. Bills, Chicago.
F. S. Munro, Sims, Munro & Thomson, attorneys, Chicago.
Otto Wettstein, Jr., LaPorte City, Iowa.
Brenton Bros.' Bank of Dallas Center, Dallas Center, Iowa.
W. S. Allison, president Exchange Bank, Gardner, Ill.
M. M. Head, cashier Green County State Bank, Jefferson, Iowa.
E. D. Boynton, president Warren-Boynton State Bank, New Berlin, Ill.
W. G. Free, president Illinois Sewing Machine Company, Chicago.
Bank of Wauseon, Wauseon, Ohio.
H. A. Taylor, president Taylor Bank, LaFayette, Ind.
V. H. Messenger, vice-president Grant Park National Bank, Grant Park, Ill.
G. H. Jameson, Farmers' Exchange State Bank, Dows, Iowa.
J. A. Hanna, capitalist, Cleveland, Ohio.
Buell & Morse, grain merchants, Livermore, Iowa.
Marcellus L. Joslyn, Chicago.
C. Korshund, cashier State Bank of Livermore, Livermore, Iowa.
L. J. Clave, cashier Farmers' Savings Bank, Ottosen, Iowa.
T. O. Hanson, cashier State Bank of Bode, Bode, Iowa.
R. R. Smith, president State Bank of Renwick, Renwick, Iowa.
J. H. Bradt, vice-president First National Bank, Rockwell City, Iowa.
A. A. Strom, secretary and treasurer Pettibone, Mulliken & Company, Chicago.
T. M. Hunter, of T. M. Hunter & Company, Chicago.
D. W. Buchanan, vice-president Hamilton National Bank, Chicago.
Philetus W. Gates, Allis-Chalmers & Company, Chicago.
Wm. H. Brintnall, president Drovers' National Bank, Chicago
John Herkenhoff, treasurer Morgan & Wright Company, Chicago.
J. C. Freeman, Lyon & Healy, Chicago.
M. H. Behreer, passenger agent Mobile & Ohio Railroad, Chicago.
Dr. A. C. Johnson, vice-president Third National Bank, Mt. Vernon, Ill.
C. W. Stiger, manager Stromberg-Carlson Telephone Company, Chicago.
H. M. Ogden, president Illinois College of Law, Chicago.
B. F. Pettibone & Company, publishers and stationers, Chicago.
O. H. Marquardt, manufacturing jeweler, Chicago.
W. I. Capen, superintendent construction, Postal Telegraph Company, Chicago.
B. F. Wasson, president Farm and City Telephone Company, Clinton, Ill.
James Davis, Recorder, Madison County, Anderson, Ind.
W. T. Jackson, general manager Co-operative Telephone Company, Rushville, Ind.
D. B. Wilson, president Mutual Telephone Company, Shelbyville, Ind.
Mrs. Mary A. Fowler, Delta, Ohio.
E. R. Harding, western manager Holtzer-Cabot Electric Company, Chicago.
L. Sands, president Williams-Abbott Electric Company, Cleveland, Ohio.
Jno. A. Gunn, vice-president Hodge & Homer Company, Chicago.
F. E. Pray & Son, real estate, Austin, Ill.
W. Dix Webster, Wm. E. Rollo & Company, Chicago.
Chas. H. Wagener, vice-president Melville Clark Piano Company, Chicago.
Henry Cribben, president Cribben & Sexton Company, Chicago.
H. B. McMeal, president Telephony Publishing Company, Chicago.

NORTHERN ILLINOIS MEETING.

The Northern Illinois Independent Telephone Association, a district organization embracing most of the Independent companies in northern Illinois affiliated with the Inter-State Independent Telephone Association, held a convention at Aurora, Ill., on January 19. Twenty-two delegates were in attendance and formed a temporary organization by electing A. B. Conklin temporary president, and R. H. Gibboney of Rockford secretary.

The main business of the convention was to devise means for the harmonious and economical working together of the various companies in this district and especially to fix toll rates and division of rates where two or more companies are concerned.

Those in attendance at the convention were:

Rockford Home Telephone Company, John H. Conlin, secretary; R. H. Gibboney, superintendent and manager; Ogle County Telephone Company, S. Wabs, president; G. W. Hamlin, vice-president; L. Beavre, manager; W. L. Landon, director; Byron Telephone Company, F. A. Nott, secretary; Yocum Line, F. M. Yocum, proprietor; Carroll County Telephone Company, F. Linnell, president; L. S. Bowen, secretary and treasurer; Streator Independent Telephone Company, A. Schuler, general manager; Bureau County Independent Telephone Company, O. C. White, general manager; DeKalb County Telephone Company, J. C. Jocelyn, president and general manager; Northern Illinois Telephone Company, E. C. Hennis, secretary; Lee County Telephone Company, L. C. Pitcher, secretary; Stephenson County Telephone Company, L. A. Herrick, secretary and manager; Boone County Telephone Company, John Thompson, secretary; Inter-State Telephone Company, E. R. Conklin, secretary and general manager; A. B. Conklin, treasurer; E. J. Clapp, assistant general manager; T. C. Ainsworth, Sterling manager; W. S. Havcock, toll line superintendent.

You will have to make TELEPHONY a Bell paper before I will give it up.—C. N. Sandbeck.

QUESTIONS AND ANSWERS ?!?!

CONDUCTED BY J.C. KELSEY, PROFESSOR OF TELEPHONY, PURDUE UNIVERSITY

What is a galvanometer used for, and can I locate a cross in a metallic line with it?—J. H. P.

A galvanometer is an instrument for measuring and detecting electric currents. It usually consists of a magnetic needle placed at the center of a coil. The current flowing through the coil deflects the needle proportional to the strength of the current. You could not measure resistance directly with a galvanometer, but only as a help to a bridge. A bridge consists of four arms, as shown in Fig. 1, in which there are two known resistances. Unknown resistance may

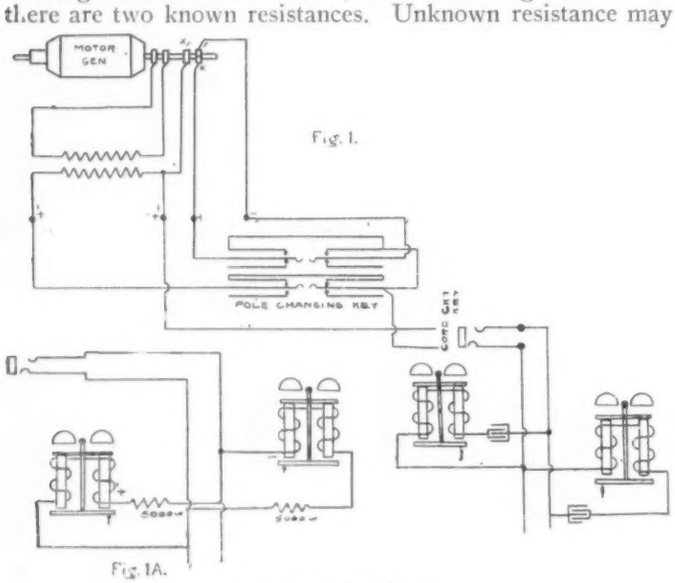


Fig. 1.

Fig. 1A.

FIG. 1 AND FIG. 1A.

be measured by the insertion of resistance until a balance is found in the circuit. If two resistances are 100 each, for example, the adjustable resistance is found to be 10 ohms, then the external resistance is 10 ohms. I am sure that any electrical instrument maker will furnish catalogue and information concerning bridge and galvanometer methods, if you request it. With a bridge and galvanometer, you can locate crosses exactly, if you know the resistance of the wire of the line in question.

We have a battery of eleven storage cells and the internal resistance seems to be too high, because the system is noisy, apparently due to the battery failing to short-circuit induction coming in on the lines. This renders all the other lines noisy that feed off of this battery. Please tell us how the internal resistance of such a battery may be determined, preferably by the Wheatstone bridge method, if possible.—W. H. M., St. Louis.

It would have been desirable to know the rated charge and discharge of the battery in question in order to show a concrete example, but the question does not call for anything but a test. The internal resistance of a cell is very small. The resistance at the end of a discharge is four or five times greater than at the end of a charge. Possibly from the end of a discharge you might observe some difference between noise effects.

The ohmic resistance is not the only cause of drop of potential across the cell terminals. Polarization is also a cause. Temperature, and the condition of the cell, and the density of electrolyte are other causes to be considered. The Wheatstone bridge method is shown in Fig. 2 and is called Rimington's method. R1, R2 and R3 are resistances, and B the test cell, in the four arms of the bridge. In the same arm with R1, an auxiliary cell is inserted, giving an E. M. F. to oppose that of cell B. G is the galvanometer (D'Arsonval preferably), and S, the switch key. R1 should be about ten ohms, and R3 about .1 ohms. On making the connections, a deflection will be noticed on account of the difference in the E. M. F. of the cells. On closing switch S, a still different deflection is noted. R2 must then be adjusted until the deflection is the same, whether S is open or closed. Then the internal resistance will be R1 multiplied by R3, and divided by R2. If polarization sets up in the cell when switch is closed, a current will flow from C to D, and the galvanometer will show a corresponding deflection. Decreasing, R2 will reverse the current through the galvanometer with reversed deflection. By gradually diminishing R2 until the impulse flows from D to C, you will notice that impulse is followed by a movement opposing, on account of polarization. Now increase R2 until there is no impulse, and your value is R2, or denominator of the equation given. One can easily appreciate that this method is extremely delicate and should be tried numerous times. There are few commercial instruments that can get down to such low quantities as .001 for instance. One way of judging the internal resistance would be practically to divide the voltage of the cell, which is normally two volts, by the current out-

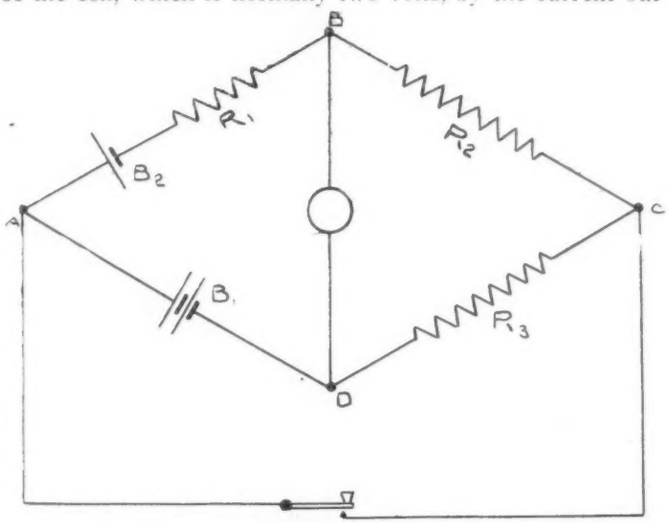


FIG. 2.

put. For instance, a two thousand ampere hour cell, or 250 amperes for eight hours as the discharge rate, means that two is divided by 250 and is equal to .008 ohms. This quantity represents the entire external and internal resistance. But to put a short circuit on the battery, or leaving the circuit closed through its own internal resistance, a thousand or even more amperes will flow. This is governed wholly by the internal resistance. Supposing that 1,000 amperes will flow, then two divided by 1,000 will be .002 ohms. This is not exactly accurate, and only serves for comparison. The amount .0002 ohms, would be nearer the internal resistance of an eight-hour rate cell of 250 amperes.

Lamar Lyndon says that the drop in cells in practically a constant for any size type, referred to a given charge or discharge. If the cell is a hundred ampere eight hour discharge rate, he finds that the drop is .05 volts, which divided by 100, gives .0005 ohms. If a four rate, the drop is .09 volts, or .09 divided by 100, or .0009 ohms. If a two-hour discharge rate, the drop is .14 volts, which divided by 100 gives .0002 ohms. If your cells have 250 ampere eight-hour discharge rate, then .05 divided by 250 gives .0002 ohms The larger the cell, or slower the discharge rate, the less the internal resistance becomes. It is not a constant quantity.

We have a central energy system and are giving a two party non-selective service. We want to make it selective over a straight metallic circuit. The sketch, shown in Fig. 2, illustrates the present arrangement.—T.-C. T. C.

The sketch shows two subscribers with biased bells, that would ordinarily respond to pulsating currents, and be thereby selective in nature, were it not for the condensers. The plus current, traversing the circuit, would be transformed into alternating current and would ring both bells. Likewise the negative current would ring both bells, because it would be transformed into alternating current. The question then becomes one that will give a reliable substitute for

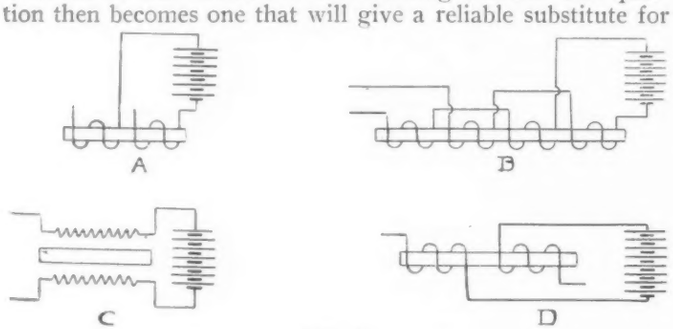


FIG. 3.

the condenser, something that will do the work of the condenser, and not interfere with the operation of the signals at the central office. The sensitiveness of your relays are the factors to determine this substitute for the condenser. That is plain, non-inductive resistance, not less than 5,000 ohms, and even as high as 10,000 ohms, placed where the condenser is in the sketch. As the resistance of the condenser to the ringing current ranges between 5,000 and 10,000 ohms, the five or ten thousand ohm coils in series with the ringers will not weaken the ringing. Fig. 2A shows the telephone set arranged for two party selective metallic ringing, when only one side of the circuit is available for ringing out on. This is a characteristic of two-strand common battery systems. The two ringers could be connected to ground through the high resistance, but it would not be satisfactory. The earth is ever an uncertain conductor of currents that agitate adjusted bells.

Our city expects to build an electric light plant soon, and I wish to know, if the city lines parallel my telephone lines on the same side of street, or even twenty or thirty feet away, whether there will be any damage by contact or induction.—G. W. C.

There will undoubtedly be noise due to induction when the lighting current is turned on. Most towns have a great deal of inductive noise, but it does not seem to worry the telephone companies. If you have a good common return, you may in a measure avoid prohibitive noises. The only real way is a metallic line with transpositions judiciously placed. If the lighting company puts in a machine like the Western Electric Company arc machine, or the Brush, or Thomson-Houston arcs, the chances are that you will be put out of business. If the lighting current is to be a parallel system, continuous current, you will have little to fear. It is the open coil armatures that play such havoc with telephone circuits. Indiana is full of tumble-down telephone plants using rusty common returns that combat fairly well with all kinds of electric current induction. As to damage from contact, you will have to put in suitable lightning and sneak current arrestors. There will be contact danger at all times, and a fuse in time will save nine, or more stations, and even lives.

We are at present giving individual line service to our subscribers, and are experimenting with a very satisfactory four party selective system, and now wish to connect up all our residence telephones four on a line. How forcibly will the change attract the attention of the subscribers? Is it a safe estimate that an individual line is idle 90 per cent of the time? If so, will it not be safe in putting four on a line?—G. P. S.

For a residence telephone, the estimate of ninety per cent is very reasonable, and if the selective devices are sufficient, there is no reason to expect any trouble from confliction. My own experience is that while manager of a system having 250 of full four-party residence line subscribers, I had but one kick from nearly 900 subscribers in one year. To emphasize more fully the condition, I had a four-party service in my house for a year before I knew that three other parties were in the circuit. I found it most satisfactory service. The trouble generally comes from the failure of the selective devices to work so that the remaining three parties will not know of the call. I should certainly advocate four parties on your residence lines. A subscriber line costs many times more than a switchboard apparatus corresponding, yet a saving of board space is important. The saving in cable room, arrestors, and the like, is certainly worth considering. But from the subscriber's standpoint, a slight reduction in the rate for four-party service will make them see things in an acceptable light. I would not advise force, for it will not require six months to swing them around. Four party service should be worth a little more than half the single party rate. To quote rates, I will say that one company I know of charges $42 for a single party residence telephone, and $18 for four party service. But any kind of service is worth one dollar a month, whatever the original one party rate. You may expect some attention from the subscribers when it becomes known that you have a four-party service at a cheaper rate. Make it optional, or ask them to try it for a time. In six months, I repeat, that you will hear no more objection. Try it by all means.

In the January TELEPHONY there is a query from the E. O. C. Co. in which you suggest to the readers that they discuss the matter and ask for more information on the subject. (1. Have the E. O. C. Co. give a drawing of office and electric wiring. (2) See if everything is well insulated. (3) See if ground contact in office and at earth is good and big enough. (4) See if wires outside on lines are clear and cable armor is bonded. (5) If using American Electric Fuse Company terminal rack, look at dead ends connecting with switchboard where drops have been changed. I write for more light on the question.—J. H. M. J., Wis.

I hope that the E. O. C. Co. will furnish the data asked for, as the problem is a promising one. As stated in the January TELEPHONY, there seemed to be some inconsistencies, and the constant reader from Wisconsin has echoed the wish of many readers for more data, and discussion of this phenomenon.

We have a couple of telephones that at times work fine, and then again do not. When the parties call central, the drop falls, central answers, and everything is perfectly dead, until central rings back, then it comes up fine. Have looked the telephones all over, and have changed them, but find that the same trouble exists.—R. G., O. H. O.

The trouble is in central office and I would advise you to look at the ringing key of the cord circuit. Spring contacts are not always reliable and the fact that ringing over the line restores connection goes to show that the contact is closed after the key has been used. There is no reason why ringing current will traverse a circuit that a voice current will not. The trouble is in the key of the cord circuit, yet as you have many pairs of cords, they could not all be said to be affected this way, and it may be that the cord circuit keys

are all bad. At all events, the trouble is between the two plugs.

In regard to cross talk, or induction, on a metallic line, does it make any difference whether the telephones are in unison—that is, the right hand binding post to the same side of the line all the way through?—O. A. V.

Usually there are three binding posts on top of the instrument with the middle one grounded for selective ringing. For ordinary service, two of the posts are strapped together to connect the bell. It makes no difference to the general operation of the line, and will cause no unbalance. If your metallic line is transposed and is free from grounds and is noisy, you have reason to suspect unequal resistance in each side of the line, such as bad connections, or unequal sized wire. No trouble of this nature can come from instrument connections such as you describe.

We have a magneto exchange with 350 subscribers on a common return. Cross talk is very bad and induction from arc lights at night can hardly be tolerated. Our main return wires are No. 8 copper and the various side leads have No. 10 copper. When there are only a few telephones the return is No. 14 iron. Our return is not supposed to be grounded except what it gets from trees. Our cables, with but few exceptions, are metallic to box, but part of our cross connecting board is not metallic to drops and jacks. Can I kill cross talk and induction without making our lines full metallic, and, if so, what size copper for return, and would you advise grounding return at exchange end only?—G. W. L.

This problem ought to be threshed out by a board of engineers, and their conclusion should be published and scattered broadcast. One of the best discussions of this problem is in Dobbs' "Inspector and the Trouble Man." There is no way to kill cross talk entirely on a common return system. A balance may be attained by making the resistance of the common return exactly what the combined resistance of the subscriber's jack, line and bell on that line is. However, this is uncertain. The No. 8 return is large enough, and the No. 10 wires are large enough, but the No. 14 iron return does not look safe for more than one subscriber. The lack of metallic standard at cross connecting rack adds to the uncertainty also. Each circuit should be entirely isolated—especially in the exchange. There should be no ground on the return anywhere, not even in trees. A ground at the office cable pole would help matters in some localities, but each case requires special treatment. I would suggest the trial of the ground at the office cable pole. Try opening the return entirely and let the subscribers get a return through the other instruments. This is certain: If your return is well insulated and all connections are well made, everything metallic between the cable pole and the exchange, and No. 14 iron returns eliminated, you should expect fair service. As to the arc machine, if it is a T.-H., or Brush, I can see no hope of quiet when it runs. Nothing but absolute balance of lines will help this matter. I have heard it advised that when subscribers number over 800 lines, the return should not come back entirely to the office. Here in Lafayette, with 1,300 subscribers on a return system, one finds such a claim disproved, because the system has a perfect Babel of cross talk in it. Secrecy is a joke. The metallic solution is the only one, and especially when electric lights are in the same locality.

What is the effect of the coils shown in Fig. 3 when used as retardation coils in the cord circuit of a common battery board, or any other circuit for that matter? First, the windings as shown in Fig. A windings connected in a reverse direction. If windings are reversed in same manner as shown in Fig. B, the primary of one connected with the secondary of the other and used as a double coil as shown in Fig. C.—Los A.

As I understand it, coil A is an end-on winding, or tandem, and B a concentric winding. I am not familiar with the relay wound with a secondary winding and take it that Fig. B is a repeating coil, which you want to use in a talking circuit. Fig. A being tandem winding will not be entirely free from retarding effect on the voice currents. Fig. B is entirely free from retardation effects on account of the parallel windings neutralizing one another before any field is generated. In the first case, a field is generated in each end of the coil, which neutralizes itself after an interval of time, but energy is constantly consumed and therefore, a tandem coil cannot be entirely free from retarding effects. In Fig. B, if you connect primary with secondary, that is, the left hand end with the right hand end, and use as Fig. A is used, there will be no retarding effect to voice currents. Or, taking the question another way, if B was connected with D in A, and the coil put in series with a current, there would be no retarding effect, if the current was of very low frequency. Likewise in B, if used as in D, the coil would act as retardation. A and B are alike in effects, generally speaking.

I am the owner of a system of toll lines and some small exchanges and desire to improve the system and overcome some difficulties. I want to do this by the cheapest method that is effective. According to Fig. 4, the line is ninety-four miles long, including branches. It is a grounded bridge line of No. 10 iron except where a few miles of No. 12 is shown at places on diagram. Exchanges exist at places marked on plat, and the one at C is the home office. The system of toll lines works very well for local business, but as the line connects with very long distance copper metallic lines there are times when I see the need of a better system. First: Will it be much of an improvement to make this system metallic by putting on another iron wire? Second: If another iron wire were to be put on, would it work properly if transposed, the present wire having been in use several years, and the new wire, being new and of better grade? Third: If the same were metallic, would it then be satisfactory to send messages over its length and then, say over 300 miles of copper line? Fourth: At times, while I can ring from C at one end to A at the other end, we are bothered to get the extreme stations, though we have a good generator.

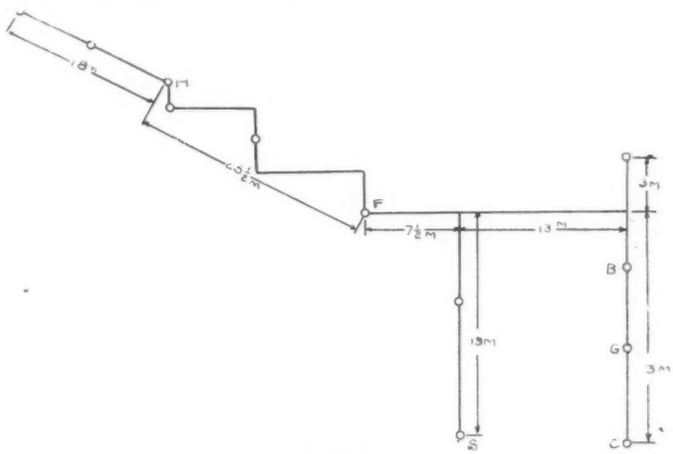


FIG. 4.

Would a Warner vibrator, or the Illinois pole changer ring through the entire line? Fifth: I desire to fix my line so that none of the stations can ring each other, but that they must all ring C. What is the best way to do this in view of the fact that at F and at H they have exchanges to work and ring on, as well as to ring on the toll line? Sixth: What system is the best of the automatic for use where the exchange will not exceed 100 lines for next fifteen years? Seventh: Is there any system of automatic exchange practical for use in an exchange of from 150 to 300 telephones?—C. E. L., C., N. D.

First: Any kind of a metallic line is an improvement over a grounded line when disturbing conditions are not too great. Where disturbing conditions are excessive and connections are badly made, a poorly balanced metallic line would be just as noisy and hard to talk over as a grounded line. Second: If disturbing conditions are not too great, a line would work satisfactorily. A balanced toll line must have as much resistance on one side of the circuit as the other. If you transposed properly, the line would have equal amounts of old and new wire on each side, and would be balanced. It will be still better if you run two new wires and take off some of the subscribers. You would then have your old grounded line with a lighter load, and the new

metallic line with fewer parties. Third: If you retain the same number of parties on the line and make it metallic, you will gain a little benefit on your long copper line transmission by reason of omitting the now necessary repeating coil. The chances are that your repeating coil is not properly designed for the work it is doing. If your iron metallic line is quiet, and you can prevent your subscribers from listening in, you should have no difficulty in talking from the end of your ninety-four-mile line, to the end of the 300-mile copper line, providing that your instruments are good for long distance work. Long-haul talking depends a great deal upon the induction coil, as well as the transmitter. Fourth: At times your line is more susceptible to leakage than at others, thereby deflecting current from the bells and reducing the pressure at the ends of the line. You should have a generator that will stand such an overload. The pole changers can be made to do this by the addition of more cells, and are an advantage over a generator, because you can increase at will either the current output or the pressure. Fifth: To make C alone get ringing signal, one plan would be to put a very low resistance drop at C, so that it would take all the current of the subscriber's generators and rob the bells. A more satisfactory way is to provide the stations with continuous current generators which will not affect the bells of the instruments, as they are designed for alternating currents. At F and H, the junction points, they could have bells also, so that C would have to ring them with her alternating current generator. The only drop would be at C, and the only alternating current generator at C. If A wanted connection at F, he would have to call C, and hang up while C was ringing F. This method is in general use and saves much useless local usage of a long toll line. It also save the line from much "listening in." Sixth: The Clark Automatic Telephone Switchboard Company, Providence, R. I., has the automatic usage of lines under 100 very widely in operation. The system is simple and should give satisfaction. I am not familiar with any other limited system. Seventh: The Automatic Electric Company, Chicago, has easily demonstrated that it can handle any number of telephones from four to 100,000. By writing to the company you can get a good idea of the practicability of its devices. There is no reason why such systems are not practical, for they certainly are. The question from the subscriber's standpoint is still an open one.

TELEPHONES IN MINES.

Although the use of telephones in mines is not of recent origin, nevertheless it is only within the past few years that their use in underground workings has been adopted by mining companies. However the advantages derived from the use of telephones in mines, like many other recent discoveries, are not really appreciated until they have once been tried. There are a great many arguments that can be used in favor of telephones—both on the surface and underground in mines. Of course the character and operations of a mine must largely determine the extent to which it is economy for their installation, but even in the small mines the results warrant the expenditure. The one item of time saving would be alone sufficient to induce any live, wide-awake man in charge of a mining company to install telephones both on the surface and in the underground workings of the mines. The great amount of time lost in a mine is far more than apparent. Every time anything is wanted by the miners working below some one must ring for the cage and go to the surface after it. This occurs many times during the twenty-four hours; and the loss of time is enormous. Each time a man is compelled to use the cage takes up just that much of the time of the hoist, as nothing else can be done while in use for this purpose. Timbers are wanted, a man is sent to the surface to order them. Powder is wanted, drills are wanted and a hundred other supplies, repairs, etc., are wanted every hour in the twenty-four, and every time some one must go to the surface after them.

On the other hand, if there was a telephone at every station in the mine all this time could be saved by calling up the manager's office or the man in charge of such, and the supplies sent to the place where it was wanted much quicker than the way such matters are attended to where no telephone is used. Hundreds of incidentals, as well as grave and important matters, come up wherein the foreman or underground manager finds it necessary to consult with the superintendent. He must ring for the cage and go to the surface, causing delay of mining operations as well as the time of the man. Were the workings of the mine connected with the superintendent's office by telephone, all this time, which costs money, could be saved, as well as the business transacted with much more dispatch. In case of accidents to the miners much time could be saved, the injured miners by telephoning the superintendent's office, who could have ambulances and surgeons at the mouth of the shaft as soon as the unfortunate men could be brought up. In many instances this prompt service would save the lives of those injured. There are many arguments in favor of telephones in mines, and it would seem that their adoption would be general.

REPRESENTATIVES OF INDEPENDENT COMPANIES CONFER.

Representatives of thirteen Independent telephone companies in central and western Illinois met recently in the offices of C. F. Tonn, general manager of the Illinois Telephone Company in Jacksonville, Ill., for the purpose of organizing an Independent telephone association and arranging matters so that it will be clearly understood what part of the gross charge each company is to receive for the transmission of a long-distance message or of messages other than local.

It is expected during the present year to establish copper metallic circuits between Hannibal, Springfield, Alton, Louisiana, Jacksonville and other cities of importance in the district embraced by the following counties, which were represented in the meeting: Calhoun, Jersey, Macoupin, Greene, Scott, Morgan, Cass, Sangamon, Pike, Adams, Brown, Hancock, Hannibal and several counties in Missouri.

When copper wires have been stretched between the leading cities in these counties a long-distance circuit will have been established, and will be of inestimable value to the various Independent companies. It is also expected that the wire through to Chicago will be completed during the coming summer, when communication may be had direct with that city. Preliminary steps were taken at the meeting toward fixing the amount of toll due each company when a long-distance message is transmitted through several of them.

The following gentlemen were present at the meeting: C. F. Tonn, general manager of the Illinois Telephone Company; J. L. Jennings of Fayette, W. H. Ramsey of Auburn, John G. Pratt of Virginia, E. D. Boynton of Pleasant Plains, W. G. Tucker of Virden, W. J. Finch, Jr., of Chesterfield, A. T. Vanninan of Girard, A. F. Loehr of Carlinville, Ed. D. Glandon of Pittsfield, H. G. Conger of Hannibal, F. W. Kelley of Springfield and W. B. Rogers of Waverly.

The Fall River Automatic Telephone Company, Fall River, Mass., has paid its fourth quarterly dividend at the rate of five per cent per annum. It now has 1,160 stations, an increase of about 100 for the quarter. Although its toll rate to New Bedford automatic exchanges is ten cents and the New England Telegraph and Telephone Company has reduced its rates from fifteen cents to five cents between these points, the earnings of the Automatic company's toll lines show a steady increase.

EXCLUSIVE RIGHT TO MAINTAIN TELEPHONE LINES ILLEGAL IN INDIAN TERRITORY.

The United States circuit court of appeals for the Indian Territory in the case of Muskogee National Telephone Company v. Hall, has said that telephone, like telegraph, companies are important agencies in the transaction of interstate commerce, and neither a state nor an Indian nation has power to grant to one company an exclusive right to maintain telephone lines within its territory; that such a grant being void from beginning cannot be invoked to prevent the construction and maintenance of lines by other companies or persons, although they are not interstate but merely local. If it were legal the direct result of the legislation would be directly contrary to the spirit of the interstate commerce laws. The legislation would stifle competition and it would be within the power of established telephone companies, by influencing the legislature, to prevent the organization of any new companies. The principle upon which interstate commerce laws are based is that competing companies are necessary for the proper stimulation of business, and a grant of exclusive rights to established companies, would have the same effect as the attempted consolidation under the name of the Northern Securities Company, of the properties of the three great railways of the Northwest, which has been at least temporarily made impossible by the decision of the United States courts. The courts have said in substance that such a consolidation is contrary to public policy and have prevented the merger. The latter case, which has been carried to the supreme court and is there awaiting final decision, is very similar to the telephone case here cited.

Muskogee National Telephone Company v. Hall, 118 F. 382.

ARE TELEPHONE POLES AN ADDITIONAL BURDEN TO PROPERTY?

Early in 1903 the Nebraska supreme court disposed of the case of Lenora S. Bronson v. Albion Telephone Company et al, which was carried to that court to determine whether a telephone company may erect its poles and wires in front of private property under its franchise provisions, without compensating the owner of the abutting property for such actual damages as the erection of the same may incur. The question has been decided in many states. It was affirmed in Ohio (37 N. E. 710); in Illinois (47 Am. Rep. 453); in Connecticut (32 L. R. A. 280), and in Mississippi (70 Miss. 406). The doctrine has been denied in Michigan (123 Mich. 51); in Alabama (31 L. R. A. 193), and in New Jersey (31 Atl. 980). In all of these jurisdictions the decisions went on the presumption that in erecting the poles and wires under franchise authority, no greater damage was occasioned than was necessary to erect the fixtures. The answer to the question depends largely upon which is to be considered of first importance, the rights of the private owner, or the right of the public to take property for such a quasi-public use, as the erection of telephone apparatus has come to be, and from the further view that the placing of poles in front of property is an ordinary use of the same. If the erection of the poles and wires is an additional burden upon the rights of the abutting owner, then there is no doubt but that he should receive compensation for the inconvenience to which he is put; on the other hand, if the law does include the presence of poles along streets as one of the *ordinary uses*, then, in law, the owner of the abutting property is not entitled to damages for any inconvenience occasioned by their presence. Whichever view is taken will determine the principle to be followed.

The plaintiff in this case applied for an injunction to restrain the Albion Telephone Company from mutilating or injuring certain trees, which had been planted by her in front of her property. The trees were lawfully in the street and the company was proceeding legally in its work of erecting the poles and wires. The injunction brought squarely to the front the rule of law in the Nebraska courts on the question. In the district court for Boone county, in which the injunction was heard, the proceeding was dismissed. The higher court, however, declared the rule of law to be in the state that the owner is entitled to damages occasioned by circumstances of the above character.

The court was also required to pass upon the question of the propriety of an injunction to obtain the redress sought. Its opinion in this regard was, that an injunction is not the proper proceeding, except in cases in which the company is insolvent, or some other special circumstance. In the absence of such conditions the proper proceeding is by a suit at law to recover damages for the injury. The remedy by injunction, said the court, would furnish an opportunity for extorting an unreasonable settlement in case it was granted. The rule, however, as to the question whether the presence of poles constitutes an "additional burden" was decided in a lengthy discussion in the affirmative.

Bronson v. Albion Telephone Company et al, 60 L. R. A. 426.

TELEPHONE NUMBER INCLUDED IN GOOD-WILL OF BUSINESS.

From 1885 until his death in 1891, John Ranft conducted a business in the manufacture and selling of ginger-ale and other light drinks at No. 229 North Bluff Street, in the city of Joliet, Illinois. Upon his death his widow, Auguste, succeeded to the business and conducted it under the name of The Ranft Bottling Works. She was sole proprietor of the business up to the first of July, 1900, when she sold the business to Gustav Reimers and others, including the wagons, stationery and bottles, and the "good-will" of the business. The telephone number of the original business was No. 1343. In a short time after the sale she decided to re-engage in the business and accordingly rented quarters at No. 117 North Bluff Street, some six hundred feet from the original plant; purchased new wagons and directed the telephone company to install the original number, 1343, in the premises, and also placed the number on her wagons. The buyers of the old plant claimed that the use by Mrs. Ranft of the telephone number originally used as the call number for the Ranft Bottling Works, was taking from them a property right which they, by the purchase of the "good-will" of the business, had in law become the owner, and accordingly procured an injunction from the circuit court of Will county restraining Mrs. Ranft from using the telephone number in question in the new business. At the hearing the injunction was made permanent. The case was

then carried to the appellate court for the second district and again affirmed. In the supreme court, to which the case was finally appealed, the lower decisions were affirmed, so far as the use of the telephone number was concerned, the court saying that the attempt to appropriate the telephone number which had been used in the business sold, and by which a large part of the orders had been accustomed to come, was such an interference with the property which Reimers and others had bought as to violate the stipulation transferring the "good-will" of the business. The decision in this case, which was given a little over a year ago, is similar to that in the case of Thoman and Stump, of Columbus, Ohio, to restrain the Citizens' Telephone Company, of that city, from removing the telephone number of D. D. Tressenrider from his old place of business, which had been sold to the former parties. The lower court, as was noted in the November, 1903, TELEPHONY, granted a permanent injunction restraining the telephone company from moving the telephone. The value of a trade-mark has long been considered beyond question and the courts have uniformly restrained others from using one established by a rival business. The property rights are little different in the case of a telephone number, and in the absence of other circumstances the decisions uniformly should uphold the principle laid down in the above decisions.

Ranft v. Gustav F. Reimers, et al, 60 L. R. A. 291.

VERDICT FOR ONE THOUSAND DOLLARS AFFIRMED.

It is well settled that the question of negligence is generally to be decided by a jury, and the courts have again and again declared this principle in personal injury cases. The supreme court of New Jersey has once more applied this doctrine in the case of Campbell v. Delaware and Atlantic Telegraph and Telephone Company, which had been appealed from a jury trial awarding the plaintiff the above sum. The question of negligence was regarding the handling of a reel of wire by the company's employes, and the jury had said that there was negligence. The company sought to set aside the verdict on the ground that the court should have passed on the question of negligence. The supreme court's view was in accord with the general rule as above stated. The company had also introduced more witnesses than the plaintiff at the trial to prove certain things, and this was advanced as a reason that the decision was against the preponderance of evidence. The court said that this fact did not discredit the finding by the jury, and that the verdict could not be disturbed on that ground alone in absence of other more direct proof and awarded the plaintiff a verdict. The case was argued in June of 1903. The reported decision of the judges is very brief and discusses the facts in the most general way.

Campbell v. Delaware and Atlantic Telegraph and Telephone Company, in Supreme Court of New Jersey, decided November 24, 1903.

QUESTION OF THE VALIDITY OF THE SALE OF THE MICHIGAN TELEPHONE PROPERTIES TO BE APPEALED.

December 24th last Judge Swan of the circuit court of the United States sitting at Detroit decided, by dismissing the two bills protesting against the sale of the Michigan telephone companies properties to the syndicate of bondholders represented by N. W. Harris of Chicago, that the sale was legal and that by the sale by Special Master Harsha the title of the properties had passed from the minority stockholders. This decision, however, will not settle the controversy. An appeal will be at once taken to the circuit court of appeals of the United States, and pending this litigation there is the suit which has been begun by George W. Harriman of Boston, independent of the suits which have lately been dismissed, which has for its object the setting aside of the sale on much broader grounds. On the day of the sale, it will be remembered that Mr. Harriman made a verbal protest to the sale of a $12,000,000 plant at the sacrifical price of $4.-100,000. For the present the suit of Mr. Harriman is the only recourse which the small stockholders have to protect their interests, and the outcome of this proceeding will be observed with much interest.

In re the sale of the Michigan Telephone Company, United States Circuit Court. Sale confirmed, December 24, 1903.

AUTHORITY TO REGULATE RATES.

What authority has a legislature to interfere with the rates of service which a telephone company may elect to charge?

The answer to this question may easily be obtained by considering the character of the property which the legislatures have found authority in law to control. Property with regard to its uses may be classified under two heads; first, that which is devoted to public uses, and that which is devoted to private uses. From the nature of things these two divisions blend and it is often difficult to determine in which class property belongs. It is evident that property which is devoted to strictly public uses must come under the control of some public authority. Illustrations of this class are parks, public halls and public streets. There is also the class of property which is directly controlled by private individuals but which is, in fact, devoted to public utilities. Under this head the properties of telephone companies belong. A telephone company, while primarily promoted for private ends, is nevertheless quite as much a public utility and is dependent upon the public for support. Relying on this public nature of telephone properties, the legislatures of many of the states have included the regulation of the matter of rates for service under its general authority to control public property. Perhaps the leading case on this subject is that of Munn v. Illinois, 94 U. S. 113, decided by the Supreme Court of the United States. In a general way that court said, "That when the owner of property devotes it to a use in which the public has an interest, he, in effect, grants to the public an interest in such use, and must, to the extent of that interest, submit to be controlled by the public, for the common good, as long as he maintains the use to which he has so devoted his property, and that he can only escape such public control by withdrawing his grant and discontinuing the use." This point came before the Indiana courts in a case decided in 1886, 5 N. W. Rep. 178, and that court in citing the United States supreme court decision, held that the legislature of Indiana had the authority to regulate rates of service. In this case it was also shown that the rates of service which the legislature provided were plainly so low that the company could not operate except at a loss. This point was called to the attention of the court, which said that notwithstanding this fact, the courts had no authority to interfere, and the only recourse for the company was to the legislature which made the law.

The above question has been before the several state courts many times and provides no small percentage of the telephone litigation of the present. Laws similar to the Indiana act are to be found in many of the states, passed by the legislatures of the same, and when not on the statute books, regulation of rates is often left to the municipalities which grant the franchises under which the companies operate. When the latter is the case the question generally arises by the companies contesting the ordinance on some technicality. As a matter of law it is plainly within the legislative authority to regulate in the matter. To sum up the above it may be said that the legislatures have authority to fix rates of service owing to the public nature and uses of telephone properties. The following cases in which the above point was raised are leading ones:

State v. Neb. Telephone Company, 22 N. W. Rep. 237; State of Missouri v. Bell Telephone Company, 23 Fed. Rep. 539; State v. Telephone Company, 36 Ohio 296.

TELEPHONE COMPANY RELIEVED FROM LIABILITY.

The case of Leavitt against the Northeastern Telephone and Telegraph Company was decided by the New Hampshire superior court at the November term, and the verdict was in favor of the company. The case arose in the city of Laconia, as the result of certain injuries which Leavitt had received on Main street of that city by falling into an excavation made by the telephone company for the purpose of putting in an underground conduit across the walk to connect with various buildings. The particular excavation at which the injury occurred was about one and one-half feet wide and of the requisite depth to lay the telephone conduit into the building. The telephone company had completed its work and had filled up the excavation with the exception of putting in the concrete at the top. This, by order of the city engineer, was left uncompleted. This official gave the order that the company refrain from putting in the concrete and stated that the city would do so. At the trial the telephone company sought to relieve itself of liability by introducing evidence that the city, by assuming charge of the putting in of the concrete had taken upon itself all liability for injuries which might be occasioned by the incomplete walk. The superior court said that there was evidence to this effect. The defendant introduced the evidence of the city clerk, showing that the telephone company had paid the city for the cost of putting in the concrete on Main street, a total of ninety-seven dollars and fifteen cents. The telephone company also read its petition to the city for a license to lay cables, conduits and other telephone apparatus on Main street, and also a bond of the defendant to the city indemnifying it against damages on account of laying these wires and conduits and digging up streets. Counsel for the telephone company said that the work was done by Clark for the city of Laconia, and when the city prevented the telephone company from completing the work of laying the concrete that all liability for which it might otherwise have been held by the act of the city had been prevented. The courts held with the telephone company on this line of reasoning and discharged the company from liability.

Leavitt v. Northeastern Telephone and Telegraph Company, in the Superior Court of New Hampshire, November, 1903.

CONTRACTS BY TELEPHONE IN WASHINGTON STATE.

The question of the validity of contracts made by individuals over telephones, which has been discussed in one or two recent numbers of TELEPHONY, was before the supreme court of the above state in the case of Young against the Seattle Transfer Company of Olympia. J. W. Young left the city in 1898, with instructions to one, Ramsay, to have his trunk stored with the above company. Ramsay called up the transfer company by telephone and asked them to call and get the trunk for storage. The first request was not heeded and a second was made, when the trunk was taken away by some party. Ramsay had no way of knowing who he was talking with over the telephone other than the sound of the voice, which he said himself that he could not recognize. The trunk presumably remained in storage for a time and was finally called for by Young. The transfer company was unable to find the trunk and denied ever having received it. The case came to trial in a King county court and Young was given two hundred and forty dollars damages as a result of the contract which he alleged that he made over the telephone with the transfer company. The case went to the supreme court and in citing several authorities said: "Communications when material to the issues through the medium of the telephone may be shown in the same manner and with like effect as conversation as between individuals face to face, but the identity of the party sought to be *charged with the liability* must be established by some testimony, either direct or circumstantial. To hold parties responsible for answers made by unidentified persons in response to calls at the telephone from their offices or places of business concerning their affairs opens the door for fraud and imposition and establishes a dangerous precedent, which is not sanctioned by any rule of law or principle or ethics of which we are aware."

One or two jurisdictions have held that conversations over the telephone of this character may be introduced as evidence. The ground on which these courts decided the point was on the testimony of the plaintiff who recognized the defendant's voice. The ordinary reliability of the telephone centrals in getting the number which is asked for is ordinarily conclusive of the party called, yet it is not a certainty in any case, and it leaves the opportunity for a reasonable doubt and hardly makes the certainty of the parties concerned conclusive. The sound of the voice or some other equally definite testimony of the parties would ordinarily be sufficient to make certain the parties conversing. In this case there was no recognition of the voice, and the ordinary certainty of the telephone central in obtaining the right party was made the ground for holding the transfer company liable. The supreme court said that this was not sufficient and ordered the case to be dismissed.

Young v. Seattle Transfer Company, in Supreme Court, Washington, decided November 10, 1903.

REFUSAL TO GIVE LONG DISTANCE CONNECTION NOT A GROUND ON WHICH RECOVERY OF PUNITIVE DAMAGES CAN BE OBTAINED.

The supreme court of Georgia has said that where a subscriber to a telephone exchange at one place desired to communicate with his regular counsel at another place was refused the long distance connection, contrary to an alleged contract, and avers that in consequence of the refusal he (the subscriber) paid unnecessarily and unjustly a delinquent employe $175 to get rid of him and to recover from him certain property intrusted to him, and to avoid a threatened lawsuit, it not appearing that such absent counsel could have controlled the delinquent employe, such payment cannot be recovered as actual or special damages. The court further held that the refusal by the telephone company of the long distance connection, without aggravating circumstances, would not entitle the subscriber to exemplary or punitive damages. A recovery of merely nominal damages would be possible, owing to the breach of the contract, but the court said that by the plaintiff suing for punitive damages this was precluded in this case under a rule of pleading which the court advanced as a reason therefor.

Haber, Blum, Bloch Hat Company v. Southern Bell Telephone and Telegraph Company, decided November 3, 1903, 45 S. E. Rep. 696.

FRANCHISE VOID.

By the decision of the Kentucky court of appeals in the case of Maraman v. Ohio Valley Telephone Company, which sustained the decision of the circuit court of Buillitt county, the above company has been given authority to operate in the city of Shepherdsville of the above state. The Kentucky statutes provide that no ordinance or resolution shall be passed by cities of the sixth class granting any franchise until five days have elapsed after the introduction of the petition therefor. A further provision states that such proceedings shall always be acted upon at a regular meeting of the board of trustees of the municipality. H. L. Maraman, plaintiff in the above suit, had received an exclusive franchise permitting him to erect and operate a telephone exchange in the above city, which belongs in the "sixth class" of cities in the state of Kentucky. The Ohio Valley Telephone Company wished to enter the same field and thereupon Maraman secured a temporary injunction preventing it from going on with its proposed work. The injunction was secured from

the clerk of the court and after a hearing before the circuit judge this order was canceled and by it the defendant allowed to proceed. Maraman carried his case to the higher court, with the results above mentioned.

The provisions of the state law are definite on the question of time that is necessary to elapse before the petition for a franchise may be acted upon by a board of trustees representing municipalities of this class. Maraman had obtained his exclusive franchise from the board of Sheperdsville, and the intention of all parties was that he should be entitled to the exclusive right which the franchise was intended to grant, but the provisions of law as to this lapse of time between the introduction of the request and the action thereon by the municipal board had been entirely lost sight of by all parties, the records showing that the ordinance conveying the franchise to the purchaser was passed at the same meeting at which it was introduced. This failure to follow the provisions of the law was so fatal a variance as to defeat the exclusive franchise and the result gave the Ohio Valley Telephone Company rights in the city under the ruling of the court of appeals.

Practically the same question presented in this case arose in the suit of the East Tennessee Telephone Company v. Anderson County Telephone Company in 1903, and the same court held on the requirement of the Kentucky statutes requiring applications for franchises from cities of the fifth class to lay over for five days that failure to comply with the law made the franchise void, the court saying, "We regard this provision of the state law as a highly important one and as mandatory."

Maraman v. Ohio Valley Telephone Company, decided October 28, 1903, 76 S. W. Rep. 398.

JUDGMENT AGAINST THE AMERICAN TELEPHONE AND TELEGRAPH COMPANY.

J. W. Davis brought an action against the above company for trespass upon his lands. The company had erected a number of poles and the necessary braces and other fixtures thereon, for which Davis asked damages to the amount of $214 in his original suit, before a justice of the peace in Greenbrier county, West Virginia. The company was willing to settle by paying $75, which amount it offered at the trial, and was refused by the plaintiff. A jury in the circuit awarded $156.25, and the company, on argument that the verdict was excessive, succeeded in setting it aside. A second trial before the same tribunal gave Davis $50 as his full satisfaction, and he thereupon sought further redress in the supreme court of appeals. The question of jurisdiction by this court over so small an amount came up for adjudication, but was settled in Davis' favor by the court deciding that it could legally recognize even so small a sum. The court, after looking over the facts on which the suit was brought, and finding that Davis' land had been injured by the large number of poles, added to which was the damage to timber, the breaking of fence rails and the general inconvenience to which Davis had been subjected, overruled the finding at the second trial and entered judgment for the amount found by the jury at the first trial. The case is interesting as furnishing an excellent illustration of expensive litigation growing out of a comparatively trifling sum of money.

Davis v. American Telephone and Telegraph Company, decided November 21, 1903, 45 S. E. Rep. 926.

RAILROAD COULD NOT GRANT RIGHT TO ERECT POLES ON ITS RIGHT OF WAY IN NORTH CAROLINA.

The case of Hodges v. Western Union Telegraph Company, in which that company had received a grant from the Wilmington & Weldon Railway Company of a right to erect poles and of all the telegraph lines between Wilson and Fayetteville, for purposes of furnishing the railway company service, and also for its own commercial purposes, has been decided against the telegraph company on the ground that the deed of conveyance of the lands over which the railway runs conveyed the same for railway purposes only, and the conveyance a second time by the railway corporation to a third party was a forfeiture of the rights which the original conveyance were intended to confer. The railway corporation, which had acquired a right of way over certain lands by conveyance from Hodges, could not grant the telegraph company an easement in the right of way for the purposes of erecting its poles and wires and maintaining a telegraphic service for commercial purposes. The law in this case, while applied in the above controversy to a telegraph company, is equally applicable to telephone companies, and were the point to arise would be decided in the same way in this jurisdiction.

Hodges v. Western Union Telegraph Company, decided October 27, 1903, 45 S. E. Rep. 572.

EARLY CONCEPTION OF THE TELEPHONE.

The supposed inventors of the telephone are so many, and their number is so constantly increasing, that the claims of a certain Charles Bourseul, whose electric telephone was described in French and German periodicals in 1854, may not be without interest. In a German daily newspaper which bears the strange title, "Dida-Kalia," of Frankfort-on-the-Main, there appears in the issue for September 28, 1854, a rather fantastic description of the wonderful achievements of Bourseul. After rhapsodizing on the "wonders with which electricity has lately surprised us," the author mentions a new invention "which will not only revolutionize telegraphy, but will also immeasurably extend its usefulness." The invention in question, we are told, is nothing more or less than the electric transmission of speech, and springs from the fertile brain of Charles Bourseul, a soldier of the army of Africa in 1848.

It must be confessed that Bourseul had the right idea. An electric current passing through a wire energizes a piece of wrought iron with which it is in contact, and converts it into a magnet. As soon as the circuit is broken, the wrought iron is demagnetized. The electro-magnet thus constituted is able alternately to attract and release a movable plate. Bourseul thought that if a metallic disk could be invented which would be so movable and flexible as to respond to all the vibrations of sounds (as does air), and that if this disk were placed in a circuit so that it could make and break the current at every impact of the air vibrations, it would by the same means be possible to cause a second similar metallic disk to repeat the vibrations in the first disk in equal time. Hence, the ear placed at the second disk would be affected as if it received the sounds directly.

The author of the article is so imbued with the possibilities of Bourseul's invention that he informs us, "if the idea is carried into effect, then the electric telegraph will be of the past."

It would seem that Bourseul had the telephone in his grasp not only before Bell, but seven years before Philip Reis produced his famous make-and-break musical telephone at Frankfort. Bourseul, however, seems not to have gone so far as to produce a working instrument adapted for actual use. Furthermore, he probably knew nothing at all of the undulatory theory of the current, upon which articulate speech depends. For that reason the courts have ignored Bourseul's apparent claims to originality in the production of the telephone. Bourseul's case is rather striking, for it is the case of the man who had to make but one short step in order to realize an idea, which, only many years later, was practically carried out.

Your publication is indispensable and worth much more than the fee charged. Independent telephone companies should be proud of it.—J. L. Gray.

The Use and Care of Storage Batteries.

GEO. W. FROST, M. E.

THE LEAD STORAGE BATTERY.

A storage or secondary battery is not a generator of electrical energy as is a primary battery or dynamo. When a current flows from a primary battery a destructive chemical change takes place within the battery, which in turn produces the current. After the action has continued for a considerable length of time the battery becomes worthless. It has given up its energy.

In order that electrical energy may be taken from a storage battery a current of electricity must first be passed through the battery. A chemical but not a destructive change takes place within the plates of the cells. During discharge a reverse chemical change takes place and the plates resume their original condition. Thus it is apparent that a storage battery, if properly made, can be used over and over again, several hundred times in fact, without materially impairing its condition. Due to the chemical changes involved, the whole of the energy required to charge a battery is not available as useful current upon discharge: consequently, in determining the size of battery to be used, its efficiency at various rates of charge and discharge must be taken into consideration.

EFFICIENCY.

The efficiency of a cell is the ratio of the energy taken out as compared with that put in.

The ampere-hour or quantity efficiency of a cell (usually about ninety per cent, if at the normal charge and discharge rate) is the ratio of the ampere-hours supplied during the charging period to the ampere-hours taken from the cell during discharge.

The watt-hour efficiency of a cell (about eighty-two per cent) is the ratio of the watt-hours available as useful current on discharge to the watt-hours supplied by the charging circuit. A newly made cell will not show as high an efficiency or capacity as will a cell which has been worked for some little time. A battery which is worked at a high charge and discharge rate will not show as good an efficiency as when worked at the normal (eight hour) rate.

VOLTAGE.

By far the greater number of primary cells in general use have an electromotive force (electrical pressure) of less than, or just about, one volt; moreover, they have a very appreciable internal resistance so that when a number of cells are connected in series, the voltage across the terminals of the series, is much less than is the sum of the voltages of the individual cells. The voltage will also vary with the quantity of current drawn from the cells. On the other hand, the storage battery has an electromotive force of about two volts and an internal resistance so low as to be negligible in all ordinary computations, consequently the voltage across the terminals of a number of storage cells in series will be equal to the combined voltage of the individual cells and will remain practically the same, irrespective of the quantity of current which is flowing from the battery. Many types of primary batteries are limited to open circuit work, for the reason that polarization, and consequent lowering of voltage, takes place in a short time after the circuit is closed. A storage battery will work equally well on either an open or closed circuit; it will give out a small or large current continuously or intermittently under practically the same voltage; thus it becomes apparent that a storage battery is an almost ideal source of current.

INSULATION.

The acid of one cell of a series must be insulated from that of the neighboring cell of the series; otherwise the two sets of elements will tend to act as one element of half the original voltage of the two cells but of double the ampere-hour capacity. It is always advisable to rest each open type cell, if in a glass jar and of considerable size, on a glass or wood sandtray, the tray in turn to rest on glass or porcelain insulators. Properly sealed cells can be placed side by side with no insulation between them other than the jars in which they are contained. Small cells are sometimes placed on wooden shelves with no insulation between the jars and the shelves. When this is done care must be exercised in keeping the shelves perfectly dry. Such shelves, and in fact all woodwork in the neighborhood of open type cells, should be kept well coated with shellac varnish.

The positive plates of an element must be carefully insulated from the negative plates; if at any time they should happen to touch while immersed in the electrolyte; or if any foreign substance, which acts as a conductor, happens to connect two dissimilar plates, they will immediately discharge their current and sometimes a destructive action takes place. Likewise care must be taken to prevent the exterior terminals of an element from becoming accidently connected by a conductor, as this will short circuit and rapidly discharge the cell. When a cell is short-circuited, the acid boils violently and the individual plates show a tendency to bend one toward another. "Buckling" is the technical name given to this action. In cells having well designed plates and the proper kind of separators, this action is not to be feared, even though the cells be repeatedly short-circuited. Cheap cells having wood separators will not hold their charge for any considerable time, as the wood soon carbonizes and acts as a conductor, thus permitting leakage to take place between the plates. Complete cells having wooden separators can be produced and sold for about twenty per cent less than cells having hard rubber separators of the best quality.

CAPACITY.

The capacity of a cell is equal to the product of the number of amperes at which the cell is able to discharge into the number of hours through which it can maintain that discharge. The capacity of a battery depends on the number and size of the plates in the individual elements of the cell; increasing the number of plates increases the storing capacity, but does not increase the voltage of a cell. If the elements are not kept fully covered with electrolyte, the capacity of the cell is lowered in proportion to the amount of element surface which remains uncovered; moreover unusual chemical reactions are liable to take place which tend to destroy the portions of the damp plates thus exposed.

The capacity of a battery is expressed in ampere hours. For example, a particular cell will, on discharge, give twenty-five amperes for eight hours, or it has a total capacity of 200 ampere-hours, when discharged at the normal (eight hour) rate. If discharged at a higher rate, say five or three hours, the total capacity will be somewhat less. For example, the above cell will discharge at the rate of thirty-five amperes for five hours; thus giving a total capacity of 175 ampere-hours; or it will discharge at the rate of fifty amperes for three hours, giving a total capacity of 150 ampere-hours; hence it is apparent that increasing the discharge rate decreases the total capacity of the cell.

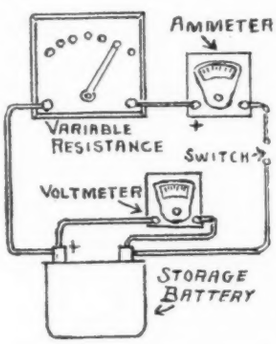
The watt-hour capacity of a cell depends in a considerable measure on the density of the acid used. Up to a certain point, the higher the specific gravity of the electrolyte used, the greater will be the capacity. Traction batteries are usually supplied with electrolyte of high specific gravity. Care must be exercised not to permit them to be discharged too low or to remain idle for any considerable length of time without being thoroughly charged; as the plates of the cells are much more liable to destructive action when electrolyte of high specific gravity is employed.

Much depends on the quantity of acid used. Some cells, particularly those intended for traction purposes, fall far short of the rated capacity for the reason that there is not sufficient acid present to possibly permit of the necessary chemical reactions which must take place in order to produce this capacity. Cells having a generous allowance of electrolyte will show a much more uniform voltage throughout charge and discharge than will cells which have just barely sufficient electrolyte.

TESTING.

Tests made to determine the efficiency and internal resistance of cells are, in most cases, quite valueless; and are usually very misleading, unless made by an observer who has had considerable training and experience in this particular work; and who is provided with instruments of great delicacy and accuracy.

To determine the capacity of a cell or battery at a given rate of discharge is a comparatively simple matter, and may be made by the ordinary observer, who is provided with an accurate ammeter and volt meter. The graduations of the instrument should not be out of proportion to the work in hand. Thus, a voltmeter whose smallest division is one volt, should not be used to determine the voltage when a single cell is being tested; an instrument reading tenths of a volt should be used.



The diagram shows the general arrangement of connections for making a test. It is usually customary to vary the resistance so as to maintain a constant current throughout discharge. To test a cell, charge fully; the voltmeter should indicate at least 2.5 volts while the charging wires are still connected.

Throw over the switch so as to permit the cell to discharge; and quickly adjust the variable resistance, so that the ammeter indicates the desired current. Read the instruments at least every half hour throughout the test; during the last hour read every fifteen minutes and carefully adjust the resistance so as to maintain a constant current. Do not discharge below 1.8 volts. The capacity of the cell is equal to the product of the current in amperes, multiplied by the number of hours during which the current was maintained. To obtain the watt-hour capacity of a cell, the average voltage throughout discharge must be determined; this, multiplied by the total capacity in amperes, gives the watt-hour capacity of the cell.

All tests should be at least satisfactorily duplicated before any confidence is placed in the results obtained.

SETTING UP CELLS.

A storage battery should be located in a clean, cool place, where it will be free from dust and dirt. The best results are obtained when the battery is maintained at a temperature of about seventy degrees Fahrenheit. Wash thoroughly the tanks or jars in which the elements are to be placed. Cells are usually connected in series; that is, connect the positive terminal of one cell with the negative terminal of the cell next adjacent, until all the cells are connected up. The voltage across the terminals or cells thus connected will be equal to the combined voltage of the individual cells.

In a set of elements the outside plates are always the negative plates and are dark gray in color; the terminal or strap to which they are connected being the negative terminal. The positive plates are dark brown in color. Always connect the positive charging wire to the positive terminal. A simple method of determining which wire is the positive when no instrument is at hand, is to dip the ends of the wire in a cup of water which contains a little salt; bubbles of gas will be given off rather more freely from the negative wire. Scrape all connections until they are bright and securely fasten all connectors. The internal resistance of a cell is very low, so that often a poorly made connection offers more resistance than does the cell itself. It is well to cover the lead connectors and bolts with shellac varnish or vaseline to prevent creeping of the acid. After everything is supposed to be properly connected, it is advisable to always go over the work and make sure that no mistakes have been made. When possible, glass cover plates should be placed over the individual elements of open type batteries, in order to exclude all foreign matter from the cells.

ELECTROLYTE.

The electrolyte used in a storage battery is made up, roughly speaking, of four parts of water (by volume) to one part chemically pure sulphuric acid. Nothing except distilled water should be used; freshly caught rain water may be used in case distilled water cannot be obtained. Although it is considerably cheaper, never use commercial sulphuric acid, as it will ruin a battery in a short time, due to the presence of iron in the commercial acid. In mixing electrolyte always use a glass or an earthenware jar; slowly add the acid to the water and let stand twelve hours to cool before using. In mixing electrolyte, never add water to acid.

The electrolyte should have a specific gravity of 1.2. This is usually written and pointed off as 1200. The specific gravity of a solution is usually determined by the use of Beaumes' hydrometer, which is an instrument so designed that the zero of its scale is on a level with the surface, when immersed in pure water. The hydrometer will rise until the 25 degree mark is on a level with the surface when sufficient acid has been added to raise the specific gravity to 1200. A hydrometer can be purchased for about $1.00 and should always be used in determining the specific gravity of electrolyte. The acid should always cover the top of the plates by at least three-eighths of an inch, and, when fully charged, should be tested every few weeks with the hydrometer.

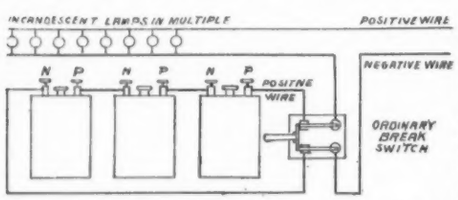
When a cell is discharged, due to a chemical action which takes place, water is formed in a rather considerable quantity, thus lowering the density of the solution; the reverse operation takes place when the cell is being charged; hence the reason for taking the specific gravity reading when the cell is fully charged. Do not use distilled water from an ice plant, as it is almost sure to contain ammonia. The presence of the following substances in the electrolyte tend to destroy the plates: Chlorine, iron, copper, and the nitrates.

CHARGING.

The electromotive force of the charging circuit should always be at least ten per cent higher than the voltage of the battery. Use a direct current; an alternating current cannot be used unless transformed. If possible, a cell or battery should be charged at what is known as the normal charging rate, or preferably at a slower rate, for the slower a battery is charged, the greater will be the quantity of energy stored. The normal charging rate is usually taken to be eight hours, irrespective of the capacity of the battery in ampere hours. Charge the battery until the voltmeter shows 2.5 volts while the live wires are still connected. Overcharging does no particular harm, but energy is wasted in so doing. In charg-

ing, hydrogen gas is given off, which, together with oxygen from the atmosphere, forms an explosive mixture; therefore, keep flames and sparks away from the battery. The danger from this source need not be considered when the care of open type batteries is under consideration, but should be borne in mind if the cells are of the sealed type. Always remove the cap from a sealed cell during the charging period, in order that the gas may have a better chance to escape than provided by the small hole in the top of the cap. When the cells are nearly charged, bubbles of gas are given off very violently from the plates. The temperature of the electrolyte rises several degrees when they are nearly charged. It is advisable to materially decrease the charging rate toward the close of the charging period. From time to time, each individual cell of a battery should be tested for its voltage. If a cell does not appear to be working properly; i. e., if it is low in voltage, disconnect it at once, remove the elements, rinse them in clean water, separate the plates and remove the separators so as to detect any small particles which may have caused a short circuit. Likewise, make sure that the electrolyte of the cell has the proper specific gravity.

TO CHARGE FROM AN INCANDESCENT LAMP CIRCUIT.



In order to charge from an ordinary 110 volt lamp circuit, it is necessary to place lamps or other resistance in the circuit in order to prevent an excessive flow of current (see diagram). If it is desired to charge a few cells connected in series, at the rate of four amperes per hour, connect eight ordinary sixteen-candle-power 110-volt lamps in multiple, each of which will pass one-half ampere, consequently the total current flowing equals four amperes. If but a few cells are connected in thus in series, the lamps will burn fairly bright, and four amperes will pass through the cells as stated. When a number of cells are being charged, the lamps will burn very dim, due to the increased resistance of the added cells, and several more lamps must be added in order that a current of four amperes may pass through the cells. If charged on a 110-volt circuit, any number of cells, up to forty, may be connected in series with a multiple bank of lamps, rheostat, or other resistance.

The cost of charging forty or less cells connected in series from a 110-volt circuit is the same as when charging a single cell. To one not familiar with the laws of electricity, this may appear enigmatical at first thought; it must be remembered, however, that, when a single cell is being charged, the energy is mainly expended in overcoming the resistance inserted in the charging circuit in order to prevent an undue flow of current.

DISCHARGING.

At low rates of discharge a battery gives a much higher efficiency than at a high rate of discharge. In discharging, the current is supposed to flow out from the charging terminal, so that care should always be taken to connect the positive discharging wire to the positive terminal. If it has been fully charged, a cell, for the first few minutes of discharge, will show a much higher voltage than it will throughout the remainder of the discharge; this is thought to be due to the presence of hydrogen on the spongy lead (negative) plate. When this has been oxidized there remains the lead surface, between which and the peroxide (positive) plate, the voltage falls slowly to 1.98 and continues to discharge at this or a little higher voltage throughout the major portion of the discharge period. Do not discharge a cell below 1.8 volts. In discharging beyond this point, the drop in voltage is very rapid.

Besides the drop in voltage and the change in the specific gravity of the electrolyte of the cell, another method of determining when it is nearly discharged, is by the appearance of the positive plates. When fully charged, the plates are a deep chocolate color; on discharge they assume a dull brown.

IDLE CELLS.

If a cell is to remain idle over two months, charge fully and then remove the electrolyte. Rinse thoroughly with water, dry and set away. When the cell is to be left standing for a very long period, draw off the acid, fill the cell with pure water and charge fully. After this the water, now slightly acidulated, can be removed, the plates thoroughly washed and set away.

THE TELEPHONE GIRL'S VOICE.

There is something peculiarly attractive about the telephone girl's voice. Probably because she is unseen and because the voice is mellowed and softened as it comes over the wires.

Anyway, it is a voice which frequently soothes an angry patron and sometimes it goes farther. Sometimes it leads to matrimony. There are many instances in this country of men of wealth who have been attracted to a young woman by the sound of her voice through the telephone.

These romances occasionally become public property. One of the most remarkable cases in which a telephone played a prominent part occurred recently in one of the big American cities when Miss Alice Bermas was married to a millionaire who had fallen in love with her voice over the telephone.

She was a telephone operator, while her two sisters were employed in a cotton factory some miles away. She was of German descent, the youngest daughter of poor people who had emigrated thirty years ago. She possessed a voice of great beauty and flexibility, which became more striking when heard over a long distance telephone.

It is to this voice that she owes her present position as wife of the millionaire.

Miss Bermas was frequently called up by a gentleman who, though she had never seen him, became, through familiarity with his voice, something of an old friend. That he lived many miles away, owned the factory in which her sisters worked, and was immensely wealthy Miss Bermas knew, but otherwise she was ignorant even of the place where he resided. Curiously enough, however, the two sisters knew his house well, and they, with other factory girls, when returning from work would pause outside the gates and occasionally watch the guests arriving in their beautiful carriages, and view with awe the dignified footmen as they paced up and down.

The millionaire, however, cared nothing for this grandeur, and when his wife died some two years ago he bethought him of the telephone girl whose beautiful voice had made so great an impression upon him, traveled down to the town where she was stationed, and called for the avowed purpose of sending a message.

He discovered the girl he was in search of, found she was pretty, though by no means beautiful, became acquainted in due time, proposed, and was accepted. Not until after the wedding did he disclose his name, and it was only when he took his bride to the magnificent house which had so pleased the factory girls that she began to realize the extent of her husband's wealth.

But America is not the only country where telephone romances are found. There is a woman now resident in Liverpool who was wooed and won entirely through the telephone. Her maiden name was Miss Constance Pratt, and for more than a year she was in charge of an exchange office not a hundred miles from Manchester.

Her unfailing good temper, her melodious voice, and her musical laugh, which could be heard when she was endeavor-

ing to smooth down a particularly irascible subscriber, must all be credited with having helped to attract the attention of a wealthy Liverpool merchant.

This gentleman, whom we will call Mr. Smith, afterwards declared that he used purposely to "blow up" the girl at the exchange in order that he might have the satisfaction of hearing her fly into a rage. But the more he scolded the pleasanter became the voice of Miss Pratt, until Mr. Smith began to think that any one gifted with so remarkably sweet a temper must be a little out of the ordinary, and he pictured himself the kind of countenance which should go with such an amiable disposition.

Finally he determined to satisfy his curiosity and one afternoon entered the exchange and "interviewed" the woman in charge.

After that visit he called her up on the telephone more frequently, and when not busy Miss Pratt would converse with him for a few minutes, and even indulge in some mild flirtation, though she afterwards denied this. In less than three months from the time of calling upon her, during which period they had never again met, Mr. Smith rang the young woman up and offered his hand, heart, and $50,000 per annum; handsomely agreeing that if the "full particulars," with which he would furnish her later, were not satisfactory she would have the option of "returning the goods."

Under these conditions Miss Pratt, like a sensible woman, accepted the proposal, and, everything turning out satisfactorily, the couple were married two months later. The bride begged that as many as possible of the telephone girls who were with her at the exchange should be invited, a request which her lover readily granted, and it is said that the number of congratulations which were sent by telephone exceeded in number anything in the memory of the oldest operator.

OPERATION OF TELEPHONE PLANTS.

We have received the following note from G. B. Sharpe, of Providence, R. I.:

"I notice in the statement of Federal Telephone that the net earnings are over 40 per cent of the gross. This is absurd. Compare the same with any of the Bell companies similarly situated and it can easily be seen that with the well known care for renewal and depreciation of the latter's lines, it stands to reason that such a result as 40 per cent can only be arrived at by a neglect of maintenance, which in the long run will be deadly to the company indulging in it. Why cannot the public see that they cannot have their cake and eat it too."

In reply to the above we can only say that 60 per cent for operation is not too low for a telephone company that is properly managed. The fact that the Bell operates for 70 per cent is only an indication that it is the most extravagantly managed public service corporation in America. Its main offices are in Boston and the property itself is not managed by its owners save over the long distance lines.

The Federal Trust Co. is now charging off sufficient monthly for depreciation and Finance believes their statements are accurate. President Dickson, of the Federal, says that a telephone company properly managed should operate for 50 per cent and he expects to have the Federal properties operating at that figure some day. He cannot do so at the present time for the simple reason that many of the companies are being operated by men who do not own them. They are being operated by local men who own but a small share of their stock. It is President Dickson's intention to sell these various properties to local men, which always results in increased revenue and decreased operating expenses. He has sold a number of properties to local men with very good results, including the Mansfield and Lima companies. Just now he is figuring on the sale of the Fostoria Company, and, as a matter of fact, expects during the year 1904 to dispose of at least three other companies. The men who have bought the properties from the Federal have invariably made money out of them.

In line with the increase in revenue and decrease in operating expenses, the Stark County Telephone Company during the year 1902 showed a surplus for stock of $600. The company, although a small one, was paying its president $500 a year, an attorney $1,200 a year and its secretary and other officials, including the directors, a salary. The management of the property was in the hands of Stark county men who owned but 7 or 8 per cent of the stock. President Dickson demanded that the salaries be cut off, which the directors refused to do. The Federal Telephone Company took hold of the property and elected their own men as directors and during the year 1903 the property showed a surplus for stock of $6,000.

The only way to make money out of a telephone property is by economical management and if they are economically managed a large sum may be charged for depreciation and very big profits made.—Finance.

SOUTHERN IOWA MEETING.

A meeting of the Southern Iowa and Northern Missouri Telephone Association was held in the parlors of the Pool Hotel January 5, 1904. John M. Jaynes of Memphis, the president, being absent, the vice-president, J. M. Kennedy of Kirksville, presided, and after calling the meeting to order a number of important questions were discussed.

The following resolutions were unanimously adopted:

"Resolved, first, that it is the sense of the twenty-two exchanges composing the Northern Missouri and Southern Iowa Telephone Association that a standard No. 10 copper metallic long-distance toll line be constructed, starting from a point near Moberly, running through Macon, Kirksville and Lancaster to some point in southern Iowa, to connect with a similar line running north to Des Moines, and from Lancaster east through Downing, Memphis, Kahoka and Keokuk, and that a company be organized with a capital stock of $100,000 and a bond issue of $100,000 be floated."

The following committee was appointed to organize the company: J. M. Kennedy of Kirksville, chairman; Theo. Gary, Macon; J. B. Gooding, La Plata; Winfred Melvin, Lancaster; W. J. Steckel, Bloomfield, Iowa; J. M. Jaynes, Memphis.

OHIO TELEPHONE CONVENTION.

There will be a meeting of the Ohio Independent Telephone Association held in Cincinnati, O., Wednesday, Thursday and Friday, Feb. 17, 18 and 19, 1904. The headquarters and convention hall will be in the Grand Hotel. This meeting was called at the earnest solicitation of a number of the members of the Ohio association. Very reasonable hotel rates have been arranged for. Cincinnati is the last city of any importance in Ohio that has not Independent connections. Indiana and Kentucky Independent telephone companies will be invited to attend, and the meeting promises to be one of the most important in the history of the organization. Special rates have been secured on all railroads, and a number of manufacturers will make exhibits. The exhibits and convention will be on ground floor of the hotel.

The program for the three days' meeting follows:

Wednesday, February 17, 9 a. m. to 3 p. m.—Registration and entertainment of delegates, secretary's headquarters.

Thursday, February 18—10 a. m., reading of papers and discussions; 1 to 4 p. m., examination of exhibits; 8 p. m., the time-honored banquet will be dispensed with and a new and novel entertainment given which you will enjoy. No charge.

Friday, February 19—10 a. m., reading of papers and discussions; 1 p. m., election of officers.

It is earnestly requested that those who are going to attend notify the secretary, E. E. Knox, Portsmouth, Ohio.

Telephony.

AN ILLUSTRATED MONTHLY TELEPHONE JOURNAL

TRUTHFUL ❧ FEARLESS ❧ INDEPENDENT

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TELEPHONY is not returnable from the newsdealer. If you desire to purchase the paper from a dealer it will be to your advantage to notify him that you will want it, in order to insure his having a copy for you. If you wish to receive the paper regularly, please send in your subscription so that we can mail it to you direct.

Change in advertisements intended for a particular issue should reach the Chicago office of TELEPHONY by the 20th of the month preceding publication. New advertisements can be received up to the 25th of the month.

ENTERED AT THE CHICAGO POST OFFICE AS SECOND CLASS MAIL MATTER

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CHICAGO, FEBRUARY, 1904.

Table of Contents.

Eighth Annual Convention Northwestern Cedarmen's Association 91-98
Voltmeter Test Circuits for Common Battery Exchanges—Charles H. Coar..... 99
Wireless Telephony—Joseph B. Baker.....100-101
Digest of Telephone Patents—Edward E. Clement.....102-108
Telephones in Australia..... 108
Independent Telephone Convention of Nebraska.....109-111
Iowa Independent Convention..... 111
Measured Telephone Service—H. D. Stroud.....112-113
Efficiency of Troublemen—F. J. Heavens..... 113
New Financial Institution 114-115
Questions and Answers—J. C. Kelsey.....116-119
Telephones in Mines..... 119
Independent Companies Confer..... 119
Decisions Affecting Telephony—G. W. Hand.....120-123
Early Conception of the Telephone..... 123
Use and Care of Storage Batteries—Geo. W. Frost, M. E...124-126
Telephone Girl's Voice.....126-127
Southern Iowa Meeting..... 127
Ohio Telephone Convention..... 127
EDITORIAL—
A Final Answer.....128-129
Development of Independent Telephony..... 129
Getting at the Truth of It.....129-130
Central Union's Condition..... 130
Independent Telephones for Postoffices.....130-131
Independent Securities as an Investment.....131-132
Are Our Telephone Periodicals Sufficiently Careful?....132-135
Independent Telephone Companies—T. S. Lane.....136-137
A Convenient Galvanometer—Walter P. White.....138-140
Properties of Hard-Drawn Copper Wire—F. W. Jones.... 140
Personal 141
International Electrical Congress—A. E. Kennelly.....142-143
Bell Telephone Methods in Canada.....143-148
Concerning Wireless Telegraph Transmitters—Lee De Forest 148-149
MANUFACTURERS' DEPARTMENT—
Modern Express Switchboard.....150-151
Automatic Adjustaphone 151
W. C. Sterling & Son.....152-153
Trade Notes 154-155
The Dean Electric Company..... 156
Measured Service on a Strong Foundation..... 157
Incorporations of the Month..... 158

A FINAL ANSWER.

The American Telephone Journal, in its issue of January 9, 1904, makes the editorial statement that TELEPHONY is a Bell organ, and that it has sold itself to the erstwhile monopoly and obeys blindly its behests. Furthermore, the *Journal* alleges that it now has conclusive proof that TELEPHONY is owned by the Bell, saying further that it has suspected as much for some time, but has refrained from making the charge until this proof should be "conclusive." The only proof adduced, however, is garbled, fragmentary excerpts from an editorial published in the October TELEPHONY.

It surely has not taken the editor of the *American Telephone Journal* from October 1, 1903, to January 9, 1904, to learn that TELEPHONY printed the article in question. We have Mr. McDonough's own word for it that the *American Telephone Journal* is always at the head of the procession, that it invariably gets the news and prints it first. Why, then, was not this charge made against TELEPHONY before? There have been a dozen issues of the *Journal* since then, and certainly a subject deemed worthy to fill the entire editorial space in the *Journal* of January 9, should have been deemed sufficiently important to deserve insertion more promptly.

It must be then that the "conclusive proofs" have not yet appeared. Much as we might deprecate the business and personal methods of the editor of the *American Telephone Journal,* we would not attack his intelligence by seriously assuming that he would expect the Independent telephone public to accept his own unsupported word that TELEPHONY is a Bell paper. As to the particular editorial mentioned by the *Journal,* we ask any one interested in the matter to read the editorial as it appeared in TELEPHONY in full, and not in the emasculated and wilfully distorted shape in which the *Journal* presented it. Without undue self-flattery, we think we are safe in saying that our Kellogg editorials are self-explanatory as to the question of whether they are Bell or not.

We do not wish to dodge the issue presented by the *American Telephone Journal.* We are directly charged with being a Bell paper. TELEPHONY demands the "conclusive proofs." Either the *Journal's* statement is true or it is not. We, and the Independent public in general, have a right to have the facts disclosed.

We append an affidavit by the editor of TELEPHONY to the effect that the charges made against TELEPHONY are absolutely false.

AFFIDAVIT.

State of Illinois, County of Cook, ss.

Harry B. McMeal, being first duly sworn on oath, says that he is president of the Telephony Publishing Company, publisher and owner of TELEPHONY, and that he is the owner of the majority of the stock of said corporation and editor of said magazine. Affiant further states that neither the American Telephone and Telegraph Company, nor any of its affiliated interests, nor any of its stockholders, own or control any stock or interest in the said Telephony Publishing Company of the said magazine; that neither the said Telephony Publishing Company nor the said magazine has ever been paid any money or other valuable consideration by or on behalf of the said American Telephone and Telegraph Company or its associated interests or its stockholders to subsidize the said magazine; and that the policy of the said magazine has never been influenced directly or indirectly by or on behalf of the said American Telephone and Telegraph Company or its affiliated interests.

Further, that the said corporation and the said magazine has never received any moneys or other valuable consideration from the said American Telephone and Telegraph Company or its affiliated interests or stockholders, or from any other persons or corporations whatsoever, except in bona fide subscriptions to the said magazine, at its regular subscription rates, and by way of advertising at the established advertising rates for advertisements actually inserted and which have appeared in the said magazine; and that as to such advertisements the said magazine has always honestly expressed the editor's opinion as to whether or not the advertisers were affiliated with the said American Telephone and Telegraph Company.

(Signed.) HARRY B. MCMEAL.

Subscribed and sworn to before me this 20th day of January, 1904.

(Seal.) HERBERT L. SPIESBERGER, Notary Public.

In order to give our statement greater force we make the following offer:

TELEPHONY will pay to any charity named by the editor of the *American Telephone Journal* the sum of $10,000 in cash if he or any other person will prove that TELEPHONY is, or ever has been, in any manner directly or indirectly under Bell influence, or that the Bell owns, controls or influences, or ever has owned, controlled or influenced a single share of the stock of the Telephony Publishing Company, or has ever, directly or indirectly, contributed to TELEPHONY one cent in money or any other valuable thing. Further, we will frame this proposition in any other different form, as may suit the *American Telephone Journal,* to cover the whole matter of the Bell's alleged interest in or connection with TELEPHONY, regarding which the *American Telephone Journal* says that it has "conclusive proofs."

In order that the Independent telephone public may know the facts regarding this matter, we propose that the decision shall be printed in full in the *American Telephone Journal* and in TELEPHONY as soon as rendered. For the purpose of carrying out this proposition we will name commissioners to act on TELEPHONY'S behalf to meet an equal number of representatives of the *American Telephone Journal,* and arrange for the investigation of Mr. McDonough's "conclusive proofs." The books and all the facilities of TELEPHONY required will be opened for full examination by the agreed judges upon this issue.

We will content ourselves, for the present, with the foregoing statement of our position.

If the editor of the *American Telephone Journal* has been indiscrete in this matter, and has been moved by an intensified bitterness of competition and has made, in the heat of passion, statements which in his calmer moments he would regret, it would be more manly to retract them than to cast upon a business rival a slur which it is impossible not to resent. We are sorry that the *American Telephone Journal* charges us with Bell affiliations, but not so much for ourselves as for the sake of Independent telephony as a whole, which cannot but look with regret upon a personal difference which has involved attacks on the integrity of the Independent movement itself.

We do not hold ourselves entirely blameless in this matter. We have, ourselves, stung by what we believed to be undeserved strictures upon our conduct, made some very caustic comments on the *American Telephone Journal.* We probably might better have permitted to pass unanswered a riot of vituperation upon TELEPHONY, rather than to have lent ourselves to a controversy in the columns of TELEPHONY at once undignified and harmful to the Independent interests which we represent. We believe that our readers are not interested in our personal differences with the *American Telephone Journal,* and we propose in the future not to inflict upon them any more of this controversy.

If the *American Telephone Journal* accepts our proposition as above given with regard to our alleged Bell connections, we shall content ourselves with a brief announcement of the fact in our March number, and later, when the decision of the judges is rendered, we will print, without comment, the decision as given.

If the *American Telephone Journal* wishes to withdraw the statement that we are a Bell paper, we shall be glad also, in our March number, to make satisfactory acknowledgement of the retraction. We shall not editorially concern ourselves, nor do we believe our readers are interested in any other part of our personal differences. We shall refrain from further discussion of the *Ameican Telephone Journal's* opinion of us and our view of the *Journal.*

We shall submit TELEPHONY each month to the judgment of the Independent telephone men of the world, upon the basis of our claim that it is the greatest of all Independent telephone papers, and we shall rest content with their decision as to our position in the field. We believe that the question of our business prosperity is largely our own affair, and thanks to the very generous and continued support of both advertisers and subscribers, we are quite satisfied at present with the fact that our February issue represents a larger net profit than any other previous issue of TELEPHONY.

We shall have other things to say editorially, and we express the hope that our subscribers may find our pages interesting and valuable reading. We assure them that we shall not burden them with either our personal or business grievances against our competitors, but reserve our ammunition for the common enemy rather than expend any of our fighting strength in quarrels with other publications.

Twenty-five years ago the telephone was a toy. To-day it is a universal necessity.

DEVELOPMENT OF INDEPENDENT TELEPHONY

There seems to be no end to the development of Independent telephony. The fact can be accounted for by the fact that when the Bell company occupied the ground of unrivaled monopoly, and the result of this monopoly convinced the progressive mind of advantages to be gained by competition, the Independent people recognized that to be successful they must do their best, must reduce cost, give better service, must meet their patrons with business propositions. This they have done.

Another reason for the success of the Independent movement is, telephone service is valuable in proportion to the number of subscribers connected with the system. This statement of fact brings forward some statistics: In Ohio the Independent people have about 160,000 telephones, the Bell less than 90,000; in Indiana the Independent outnumbers the Bell by two and one-half times; in Kentucky two times, while in the United States the Independents have over 1,500,000 more telephones than the Bell, and the people in general and the business men in particular are quick to understand and seize upon that which gives maximum service at minimum cost—or, in other words, they are eager for the project that will reap the greatest harvest and reach the most people—hence the deserved popularity of the Independent movement everywhere.

Humanity has always desired to add to the potentiality of the voice by attempts to extend the range of utterance.

GETTING AT THE TRUTH OF IT.

TELEPHONY has come into possession of a letter written to an Independent telephone exchange manager, which is printed herewith in full to show the Kellogg company's present position. The letter is written on the Kellogg Switchboard and Supply Company stationery, and is signed by Harry M. Faris, the company's accredited representative. The letter follows with recipient's name omitted:

Chicago, November 20, 1903.

Dear Sir:—

I have noted somewhere that you intend to put in an exchange at ————. I believe if this is not already ancient history and is correct information isn't it about time for me to hear from you? Our strike has for some time been only a remembrance. We are now running to the full extent of a larger capacity than ever before, are able to keep close up on our switchboard schedule and can ship telephones in compact and other standard cabinet styles within twenty-four hours (Sundays excepted). The company is now under the best and most vigorous management it has ever enjoyed, has a clearly defined business policy and an asusred future. The relations between employees, engineers and minority stockholders and the new sole majority stockholder, Mr. Enos M. Barton, are most harmonious and satisfactory in every respect. The American Telephone & Telegraph Company and The American Bell Telephone Company have nothing whatever to do with the Kellogg Company. Neither has the Western Electric as a company, and the Kellogg is not "Bell" in any sense of the word. Mr. Barton did not ask the minority stockholders and the company's customers to take his

word for anything in respect to his future moves. Bonds to the extent of millions and millions of dollars have been given to past and present customers, guaranteeing everything they could wish for and immensely benefiting their own securities. These bonds are for the most liberal amounts and although of course on a business basis they come very near reading "heads you win, tails we lose." They are a contingency that will never come about.

What has Barton made up his mind to do? To make Kellogg and Western Electric, which are one in engineering and practice, *the apparatus of the future.* And he is going to do it in a comparatively short time (for in telephone business history is made rapidly).

There will be but one place to buy equipment, you will pay no more than you now do and will receive for your money a value that can not be produced in a small factory or in what we are wont at the present time to call a large factory, such for instance as our own present one. At that time the largest Bell company will have to be content with purchasing the same equipment at the same place as does the smallest Independent company, and if the two then wish to fight they will fight with the same weapons, or if they do not wish to fight, their stuff will fit as one harmonious unit.

You no doubt have been reading of late a considerable amount of trade journal hot air concerning the true origin of which I will enlighten you, although doing so is an insult to any man's intelligence. The editors of the two leading journals have frankly admitted to us in personal interviews that: they are waited upon by a committee representative of a bunch of outfits unworthy of being mentioned as competitors to any honorable concern, although among their number there were those who are sometimes classed as belonging to the leading manufacturers. They made their demand for the use of the editorial pages of these papers for the sole purpose of getting the almighty dollar their way, and backed up these demands with threats of ruin for the editors in the event they did not immediately and unconditionally comply and promised immense sums of money in the purchase at fancy prices of tons of copies of these papers for widespread distribution. To the editor (whom we do not blame) their threat was not bluff but an only too real reality. Their paid circulation is very limited and they are compelled to depend on advertising almost entirely.

The withdrawal of all telephone advertising (except our own), the starting that very week of a real Independent paper that would have bawled them out as being in collusion with us "in our infamous schemes," would have cut the papers to their paid subscription circulation, with which the ads. of others than telephone people would have proven unprofitable and been abandoned, leaving the papers stranded and their backers in financial ruin. They are taking the rot and publishing it under protest. We have not and will not print a word in rebuttal. We are getting the free advertising and they are daily disgusting and driving over to see us scores of the best telephone men in the country by the extreme yellow color of their knock and its utter lack of argument (let alone truth). But what else are these people doing besides knock? *Four of them are frantically endeavoring to sell their plants.* Many of the smaller companies who were too white to become officially mixed up in the knock are scared half to death and the entire telephone manufacturing industry is shaken from center to circumference. Every hammer blow on Barton's new building, by the side of which our present magnificent factory will be but a pigmy, seems to strike new terror to their hearts, and, as I said before, *Kellogg,* the concern that looks safe to the surety companies, the one that is able to give bond, is the only one whose future can be depended upon.

Trusting that you will pardon my having continued to greater length than I had intended and that you may find herein something of enlightenment on this important matter, also that having stated where we are at, I may have the pleasure of learning your position, I beg to remain,

Surely this is a beautiful condition of affairs. Independent telephone men should read this letter over several times to gain its full import, especially should they read carefully such sentences as these:

"The relations between employes, engineers and minority stockholders, and the new sole majority stockholder, Enos M. Barton, are most harmonious and satisfactory in every respect.

"What has Barton made up his mind to do? To make Kellogg and Western Electric, which are one in engineering and practice—*the apparatus of the future.*

"At that time the largest Bell company will have to be content with purchasing the same equipment, at the same price as does the smallest Independent company, and if the two then wish to fight with the same weapons, or if they do not wish to fight, their stuff will fit as one harmonious unit."

The above paragraphs show beyond any shadow of doubt just what the Kellogg company is, and what it will attempt to do. The company's position is all wrong; it is a menace to Independents. The whole truth is becoming known, and Independents can now see the real Bell owners. After the publication of this letter no Independent telephone man will buy Kellogg apparatus at any price. The amusing part of the letter is the picture of the disastrous future for the Independent telephone publications. TELEPHONY is enjoying its share of the general prosperity of the Independent movement and will be doing business at the old stand long after the Kellogg-Bell Congress street factory has passed into oblivion.

The reference to other manufacturers having Bell affiliations, or wishing to dispose of their business to the Bell, is so ridiculous that it requires no comment. Surely if any Independent manufacturer ever thought of selling to the Bell, the lesson of the Kellogg fiasco would be sufficient to prevent any such act of business suicide.

The Kellogg is down and out, and no power can save it from the ultimate destruction it has brought upon itself. It is *Bell* and nothing else, and is not entitled to any consideration or support from Independents, nor will it receive any.

The telephone differs from all other electrical devices in that it is the only electrical appliance which does not require skill on the part of its users. It is equally the servant of all, a polyglot it speaks all languages and acts as a faithful messenger for the whole gamut of sounds.

CENTRAL UNION'S CONDITION.

Word comes from Boston that the parent Bell concern is coming to the rescue of the bankrupt Central Union Telephone Company, a western Bell sublicensee, and two or three million dollars will be dumped in the middle West in an attempt to save the company. The condition of the Central Union is hopeless and the parent company might well keep its money in reserve to postpone its own finish. The following press clipping will show the condition of the Central Union Company in Bureau County, Illinois. The conditions elsewhere in the company's territory being about the same:

The Central Union Telephone Company, known as the Bell Trust, is said to be losing its hold rapidly in Bureau County. Several years ago it had about 70 telephones in use in Princeton. Now it has about a dozen and in a vacant store room is piled up dozens of discarded instruments. The Central Union has no longer any service between Princeton and Tiskilwa. The business gradually dwindled down, and a few weeks ago the poles along the highway between the two towns were chopped down. The company had a toll station at Dover, but has been requested to remove it. It is claimed there was only about 20 cents' worth of business done last month, and that it does not pay to bother with it. Here are some of the towns in Bureau County which the Trust cannot call up: Tiskilwa, Dover, Walnut, Kasbeer and New Bedford. The Princeton city council passed an order giving the company sixty days in which to remove the unused poles and wires and directed the superintendent of streets at the end of that time to chop down the poles, if the company has not complied with that order.

The telephone would have remained a piece of physical apparatus, an example of the correlation of forces, an instrument to aid in the study of sound and a wonder to all, had it not been for the invention of the switchboard and the development of the telephone system of which it formed the essential nucleus.

INDEPENDENT TELEPHONES FOR POST-OFFICES

The order of the Postmaster-General displacing Independent telephones in postoffice buildings in favor of Bell instruments is a subject of increasing interest to Independent telephone men. It would seem as if the first instructions given by Postmaster-General Payne were confined to a few localities, with the object in view of testing public sentiment. While the Postmaster-General's action was condemned as soon as it first became known, it was not until some time later that the full import of the order became evident to Independents. Now that it is understood that the Postmaster-General has made a broad and sweeping order on this subject, which will displace thousands of Independent telephones in favor of Bell instruments, the Inde-

pendent public has become thoroughly aroused to the gravity of the situation, and protests are pouring in to congressmen and senators from every part of the United States.

It certainly is natural to regard Mr. Payne, who at one time was president of the Wisconsin Telephone Company (Bell), and whose financial and personal interests, it is understood, are still intimately associated with the Bell company's success, as being influenced in a very large degree by a desire to do the Bell company a service. Mr. Payne has made a statement to the effect that the sole reason why the order has been issued is to give uniform service by long distance connection between the postoffice department at Washington and the various local postoffices throughout the United States. He makes the statement further that the government desires to secure the best service for the purpos of carrying on govrnmental work, also stating that there can be no question that the Bell service is the best. Mr. Payne is sufficiently kind to admit that the Independent service in a very large number, if not the majority, of the cities and towns where the government has a postoffice reaches by far the larger proportion of the people who patronize the postoffice. He states in effect, however, that the interests of the public are not to be regarded in comparison with the interest of the government officials, transacting business between themselves and with the government direct. In other words, that the sole function of a telephone in the government building is to enable different departments of the government to talk with each other, and as there is no Independent connection with Washington, and the Bell company does have an exchange in Washington, the Independent instruments do not offer to the government satisfactory service. That reasoning might apply in a country afflicted with an autocratic form of government, such as Russia, where the interest of the people at all times is regarded as a matter of secondary consideration. But in a free country like the United States, with a government of the people, for the people and by the people, in theory at least; and in a country where it is a well-recognized principle that all just powers of government have their source in the consent of the governed, Mr. Payne's principle does not apply. The people of the United States support the postoffices of the United States, and it is for the people of the United States that the postoffices should be run.

Of late years the government has been making herculean efforts to extend the postoffice service to the remotest farm through rural free delivery routes. For years the government has been carrying newspapers and other second-class matter at a loss that the people may receive the benefit of good reading matter at the lowest cost. It has been, and is to-day, a recognized fact, that the postal department is a financial loss to the government, in most of its departments, by reason of the desire to give the people inexpensive postal service. How utterly ludicrous and absurd the statement is, that in connection with telephones, which are well recognized as necessities of modern life, the government has no concern with the interest of the public at large, but should arrange for a telephone service which practically amounts merely to an inter-communicating system between government departments.

It is alleged that the government must have telephone connections from the various postoffices to Washington; and that to put in telephones in order to give Independents government connections would mean a useless extravagance on the part of the government. This is new language to American ears. The government of the United States is rich, powerful and secure in its revenues for years to come. At the present time, in fact, it is in the enjoyment of a constantly increasing surplus, which should be, and in other departments of the government is, being devoted to the public good. There is no one thing which the government can do at so little expense to contribute so much to the happiness and general welfare of the people at large, as to bring the government buildings into close telephone connection with every telephone subscriber in the United States. It is a retrogression from the present established standard of governmental excellence, to deprive the people of the enjoyment of the fullest exercise of the right to secure prompt government service in connection with every government department.

The question of cost is inconsistent in connection with the United States, which annually spends millions of dollars in pensions; which conducts, on the most expensive scale, numberless enterprises contributing to the public welfare, and which has recently concluded a war with Spain to secure the amelioration in living conditions of an oppressed people, and even now is planning for the expenditure of fabulous millions for the construction of an inter-oceanic canal. How absurd it is to say that for the sake of the expense of a comparatively small amount of money each year, the government must deny to the public the right of telephone service between a large majority of telephone users in the United States and the local government buildings in each city.

There is no question of privilege here. There is rather the larger principle of right, and the government of the United States should wash its hands clean from contact with that most execrable of would-be monopolies, the Bell Telephone Company. What a sorry spectacle does the Attorney-General of the United States present when at the same time that he is in the courts endeavoring to put an end to gigantic trusts, the Postmaster-General endeavors to fasten upon the government the grip of one of the worst trusts of them all. We cannot believe that the President of the United States will countenance on the part of his subordinate this action in connection with the telephone service of the postoffice department.

That there may be no question regarding the feeling of the public on this subject, we recommend that the manager of every Independent exchange in the United States address to his local congressman and senators, a letter of vigorous protest against this threatened partnership between the government and the Bell. If every congressman and senator is clearly and distinctly informed that his constituents will not permit this confiscation of their rights, and if telephone users everywhere, and especially in the rural communities of the United States will second this protest with their demand for the continuation of service to the postoffice, this order will be repealed, and Independents will not rest content until it has been wiped off of the government regulations. TELEPHONY requests all of its subscribers to forward to it the protests of telephone users on this subject, and it will forward them to the President direct, and continue doing so until this obnoxious order shall be only a memory.

The electrical transmission of speech and its instantaneous reply is the last step in the progress of modern enlightenment in that concentration of effort and result which reaches to every phase of life in its modification of commercial and personal relations between individuals isolated from each other's presence.

INDEPENDENT SECURITIES AS AN INVESTMENT.

Securities of any kind, to be a good investment, must be safe. The first prerequisite of a bond or stock issue which shall carry conviction of safety and security with it is character and intelligence in the personnel of the corporation. The true foundation of the corporation is in the individual members.

In estimating the value of the securities offered by telephone companies, it is of the utmost importance to examine into the question of location, surroundings, population, outside connections and inside influences and management. Necessarily the Independent movement has been localized.

A critical examination will show that nearly all the Independent exchanges of the country are under the control and management of home people. These people have ventured their time and money into an enterprise that protects their neighbors, as well as themselves, from higher charges that they were forced to pay the Bell monopoly, and the public understands that if it should withdraw its support from the Independents it would mean personal loss.

So it is assured that the Independent telephone is a fixture. It has come to stay, and the conditions behind its securities are permanent. The main question then is, have they the necessary earning power to promptly meet their interest and put aside a safe sinking fund? In dealing with this general question it is of the utmost importance that we reckon the gross earnings from a given number of subscribers for a given period of time as against the expense and fixed charges, including interest of the bonds, and see what the result will be. If you find that there is sufficient earning power to cover your entire charges, then you have a safe investment.

The history of exchanges shows that not only are they abundantly able to take care of their expenses, fixed charges and interest, but pay good dividends on their stock.

It is safe to say that out of the 7,000 Independent exchanges, with an investment of $300,000,000, serving more than two million subscribers, not one per cent thereof will ever default on the interest or principal of its bonds, even at the present rates charged for service.

But the investor with his ever-ready question is abroad, and in this inquiry he is to be reckoned with. First, he is solicitous to know how it is possible to maintain two opposing telephone exchanges in a single town on a paying basis. The history and experience of every town having two exchanges in which a first-class Independent exchange has been inaugurated has demonstrated that the increased number of telephones in use is greater than the number in service when there was only one exchange. As an illustration, take the telegraph companies in nearly every town where the Postal and the Western Union compete for the business. The Western Union occupies the field first, and there were few people who did not believe that it would be impossible for the Postal to sustain itself, yet we all know that the increased business, at the reduced rates, enables each company to protect its bonds and pay its stockholders, and the future will see the telegraph repeated, to an extent, in the telephone. The only difference will be that the Independent exchanges will prosper while the Bell exchanges will, in nearly all cases, fail. Again, the inquirer says, suppose you are on a paying basis at present, what assurance has the investor in your securities that you will be enabled to maintain the rate and retain your subscribers, so as to give you a definite and fixed income with which to meet your obligations?

Let the incontrovertible facts answer the question:

First: It is conceded on all hands and has been fully demonstrated by the test of time that the telephone is no longer in the category of luxuries, but is a household and business necessity. You can no more get along without it in your business than you could dispense with the telegraph or mail; as a means of economy it pays its hire many times over each month, and as an aid to business it is indispensable.

Second: The wonderful and continuous increase in the number of telephones in service is proof positive that the growth of the exchange is natural, permanent and certain, insuring continued and increasing patronage.

But, says the inquirer, your facts apply as well to the Bell as to the Independent securities that we are concerned about. Please answer definitely.

Again let the undisputed statistical facts make answer: The Bell telephone began its business career a quarter of a century ago, without competition, let or hindrance, backed by countless millions, under a management shrewd, energetic and skilful; protected by letters patent and the most astute lawyers that money could employ, and, after a career in an unobstructed field, the entire number of Bell telephones in use to-day is only a little more than 1,200,000, whilst the number of Independent instruments in service is nearly 3,000,000, a most marvelous record when you consider that the age of the oldest Independent exchange in the country is less than ten years.

With that fact staring him in the face can any reasonable man doubt that with proper construction, reasonable rates, good service, and conservative management, Independent telephone securities as an investment are not only safe, but more desirable than almost any other securities?

The striking feature of the two great applications of electricity which are used by the public—namely, the street car and the telephone systems—is that, however complex their mechanism, their use is extremely simple.

ARE OUR TELEPHONE PERIODICALS SUFFICIENTLY CAREFUL?

Under the unattractive caption of "Contemporary Cross Talk" a series of some forty or more dissertations on the subject of telephone rates appeared in the pages of the *American Telephone Journal* during the year 1902 and the first half of 1903.

That these presentations of a subject of vital importance to all telephone men were interesting none can truthfully deny. The deductions were logically drawn when considered from the advanced Bell point of view. But if the conclusions are true, then Independent telephone plants are foredoomed to failure. For almost every argument advanced is a direct blow at the foundation on which the whole Independent movement rests. Yet those statements have gone out to investors as correctly illustrating the theory and practice of Independent telephone companies and are vouched for as Independent opinions by the editor of the *American Telephone Journal.*

In a more concise form and contributed to a Bell organ, or even to an Independent journal under a warning title and bearing the safeguard of the author's full name, that series would have been a valuable contribution to the literature of telephone rates as clearly illustrating Bell views. But the treachery displayed by the editor of the *American Telephone Journal* in conniving at their admission to his journal, though well knowing the aim and purpose of the Bell official who prepared them, must necessarily lead Independents to look with horror upon every issue of that publication containing the writings of "The Listening Key," alias of a well-known Bell official.

Nevertheless, the aim and purpose for which that series of articles was carefully prepared has been accomplished, and even that editor knows that the results are more far-reaching in scope and deadlier in effect than the projectors believed possible. The deed is done. Thus any criticism of the technical value or of the literary merit of one or all of the contributions is of no moment.

Who wrote the articles in question? Under the disguise of "The Listening Key" they were written by an official of a Bell company, a man of world-wide experience in solving problems in telephone traffic, a man whose ability in his chosen profession none can question, a man who wears the title of "assistant to the general manager."

For what purpose was that series prepared? Primarily to influence capital in New York city and in Washington against the advisability of making investments in Independent plants in either of those two cities. Crystallized in circular form, with all disguises in the form of diffusiveness eliminated, so potent for evil were these "Independent Opinions" copied from "a rabid anti-Bell journal" in the matter

of shutting off investments in New York and in Washington, and in educating business men to accept Bell theories and Bell practice as the only true Independent gospel, that the same "Independent literature" has been as judiciously distributed in Cincinnati, Milwaukee, New Orleans, Denver, San Francisco and other cities.

What noticeable results followed the distribution of this "Independent literature"? Among the immediate results are the loss of a year's work and all the attendant expenses for several gentlemen who had been earnestly working to establish Independent plants in certain large cities; the loss of the orders that would have been placed for equipment, material and supplies; and last, but not least, the loss of that invaluable prestige that would have stimulated the growth of the whole Independent movement, had Independent exchanges been established in New York or in Washington, in Cincinnati or in Milwaukee.

One promoter testifies that in the city of Milwaukee every financial institution save one has been thoroughly educated to believe that Independents promulgate and practice all that is stated in that series of articles, as crystallized in circular form. If this is the case in Milwaukee, are not financiers in all other large cities likely to be imbued with the same false ideas? And, if this be true, then who can measure the ultimate results of so base a betrayal?

Following are a few paragraphs copied from leaflets purporting to truthfully portray "the theory and practice of the Independent telephone movement, as enunciated in the pages of the rabid anti-Bell *"American Telephone Journal,"* and based on the claim that "the father of all telephonic mistakes is the flat rate":

"These notes have dealt chiefly with fundamental principles, and the guiding endeavor has been to point out in them some of the main channels in which a successful telephone business may be run. . . . In pointing out these changes and in forecasting the future trend of the telephone service, under a policy of active development, it is to be hoped that our discussions of rates and service may have given the thoughts of telephone men on the important subject of rates a new turn."

And "our discussions" certainly have given "a new turn" to the thoughts of telephone men regarding that phase of journalistic ethics that would sanction so base, so dastardly a trick as to publish Bell views and opinions as "the theory and practice of Independent telephone companies," while fully understanding that in so doing the "fundamental principles" of the whole Independent movement were being undermined.

"Bismarck once said that a fool learns by his own experience, but a wise man profits by the experience of others. There is now a fairly large and accumulated fund of experience as to the working of the various schemes of telephone rates that have been tried and it seems a trifle worse than foolish for new telephone concerns to start business with plans that willfully ignore all the teachings of that experience.

"If there is one thing that experience has shown everywhere it is that flat rates in large systems do not pay; that flat rates for large systems are fundamentally incorrect for the reason that if high they prevent development and if low they sooner or later become unprofitble. If that point has not been conclusively demonstrated these notes have been written in vain."

That is a nice statement to furnish capital to assail the Independent promoter with, a statement indorsed by the editor of the *American Telephone Journal* as representing Independent opinions.

"The most difficult point that a telephone manager has to deal with is the question of rates, and in the establishment of a new concern he is faced by the awkward difficulty of having to fix his rates long before he can have any accurate knowledge of what the cost of production will be. Rates and prices are generally, but by no means always, determined more or less by the cost of production. This is less true of services than it is of actual commodities, but whatever the various modifying influences may be, one thing at least is certain, and that is that if the cost of production is sensibly higher than the selling price a losing business must result.

"Many people seem to have thought that the telephone business was immune from this natural law, and have been guided by ignorant or intentionally misleading estimates of cost of construction and operation to adopt rates that have quickly proved to be unremunerative in actual practice."

Think of telling capital that "the editor of the *American Telephone Journal* assures us" that

"Many people have been guided to adopt rates that have quickly proved to be unremunerative in actual practice."

In other words, that many Independent exchanges are losing investments. And what a slap in the face for manufacturers and contractors who earnestly strove to guide aright. But if

"Many people have been guided by ignorant or intentionally misleading estimates of cost of construction and operation,"

did the few who are making a profit follow their own suggestions? Then this same belittlement of contractor and manufacturer continues:

"It is clear that the telephone manager is in a most difficult position in having to fix rates for his service before he has any practical experience of what the service will cost him to supply, but he undoubtedly increases the difficulties if he refuses to be guided by the experience of others and listens solely to the interested advice of those who have little care as to what the future of the concern may be. Contractors and manufacturers are eminently qualified to estimate the cost of the plant called for by a given specification and are qualified to a certain extent to estimate the cost of its yearly maintenance, but their estimates are to what the total cost of operation will be and what the various rates for service should be are by no means always safe guides on which to draw up a schedule of rates."

How strong would adjectives have to be to rightfully express the feelings of the promoter who was handed that statement by a capitalist, and found that it was reproduced from the *American Telephone Journal* of January 24, 1903, in which his own firm was carrying a full-page advertisement?

"The manager who estimates everything at the lowest possible figures ignores depreciation and contingencies, possibly omits any allowance for very necessary working departments and then puts out a very low flat rate, inviting his customers to talk as much as they like, is flying in the face of all previous experience, and is piling up trouble for himself that will inevitably become manifest before very long. It is by no means easy to raise a rate that has once been fixed, no matter how plainly evident it may be that the rate is unprofitable."

An elegant scheme, was it not, to drive home in the mind of capital that flat rates, and more especially the low flat rates on which the Independent movement is founded, are fallacious and the results unprofitable? And to drive that idea home through the aid and co-operation of a supposed Independent journal, thereby conveying the idea that the statements embodied the views of all anti-Bell men, was the plot of a master-mind.

On May 9, 1903, the editor of the *American Telephone Journal*, in a heart-to-heart talk with his subscribers, publicly stated that

"About the cheapest thing on earth, when he is inclined to be dishonest, is the country editor."

Some one has said that it takes a thief to trap a thief, and that many a trickster is betrayed by his own words.

"The flat rate in a large community is unjust both to supplier and to customer; the small customer helps to pay for what the large customer gets, and, since all pay the same, the large customer gets more than his money's worth. The hard and fast flat rate is obviously illogical and is bound to disappear from large places where the telephone management has in view the development of the telephone service up to limits of its possibilities. Even the modifications and variations that obtain in flat rate tariffs of mileage charges for lines of more than a certain length and of lower rates for residence than for business service, are but makeshift devices that do not hide the falseness of the principle.

"The flat rate therefore stands condemned except as concerns small systems in which the facilities supplied to each telephone user are about equal. The users of these small systems about correspond to a group of commuters traveling daily between the same two stations on a railway; each pays the same monthly rate and each makes the same average use of the railway facilities. The flat rate applied to large systems would correspond to a method of railway charges whereby all living along a line say fifty miles long would pay the same commutation rate, though some would travel daily only ten or fifteen miles, while others would travel twenty or thirty, and still others the whole fifty miles. However, argument and illustration

are not needed to convince the enlightened telephone man that flat rates are wrong in principle."

In every large city the establishment of Independent plants has been founded upon reasonable flat rates.

"With telephone service supplied under a flat rate there is no measure, practically no fixed quantity, and nothing to go on, in short, but the assumption that the average amount of service demanded will be something or other and always about the same. When a flat rate manager makes a contract with a new subscriber he has no means of knowing whether that subscriber will pay him a profit or not, whether he will use one, five, ten or a hundred calls a day. The only way he can make himself safe is by fixing so high a rate that only the few excessively busy lines will be unprofitable; and such a rate has the natural result of repressing the development of the telephone by putting it out of the reach of many who would use it at a lower rate. If he bases his rate on some estimate of the present average amount of use and fixes a low rate that will tempt a large number of subscribers he is simply planting a stake for the tide to overtake. With the growth of the system and the growth of the telephone habit he will sooner or later be called upon to furnish a larger amount of message miles than he is getting paid for, and then he must either go under or pull up his stake and recast his rates."

Put yourself in the place of the promoter who spent many long months fighting against these intangible weapons worded to meet every argument he advanced, and then imagine what you would say and how you would feel with statements like these to combat.

An editor who evidently wrote from past experience thus sizes up this same situation:

"There is a company of gentlemen, with temporary residence at Joliet, Ill., who would be filled with admiration and envy could they read certain public prints these days. These gentlemen fell afoul recently of the United States authorities in the matter of a little transaction in green goods. The bases of their operations were little circulars purporting to be newspaper clippings and popularly known as 'Green Goods Circulars.' It was largely on the evidence of these circulars that the unfortunate gentlemen were sentenced to an active but retired existence within the walls of Joliet.

"Had they only waited awhile, they might have had lessons in a green goods circular game that promises just as good results in the way of 'catching the farmer' and yet leaves the promoters free and unhampered to pursue their useful careers outside of a cell. . . . These gentlemen have so far improved on the green goods circular game that they do not send out imitation newspaper clippings, but distribute instead the real thing. The beauty of this scheme is that it leaves the workers free from entanglement with the criminal laws. Nor is it much more expensive than the method pursued by the foolish Joliet group."

No wonder the editor of the *American Telephone Journal* can laughingly boast of having driven "the last nail in the coffin of flat rates." And the whole Independent movement is founded on reasonable flat rates.

Here is some more of "the real thing" liberally dealt out to capital, free of charge, and bearing the imprint of the *American Telephone Journal:*

"We have said that the traffic will range from an average of about one call a day to an average of about one hundred calls a day among the different subscribers. Even at our low imaginary figure for actual cost of operating of one-fifth of a cent a call, this would mean that the traffic of the small user was costing only sixty cents a year, while that of the very busy subscriber was costing sixty dollars a year. At an average of fifty calls a day the traffic of a single line would cost thirty dollars a year, as much as the rate charged, in many cases more. This clearly means that the small user, whose traffic costs only a dollar or so a year to handle, is helping to pay for the cost of handling the traffic of the big user. This is obviously an unfair proposition, and moreover it is an unbusinesslike one. The practice of giving the big man more than his money's worth and of making a number of small men contribute so as to prevent the supplier from losing money on the big man's service is a false method of doing business that is followed in telephone work alone. It has arisen entirely from the erroneous idea which telephone men have so long clung to of basing rates upon averages."

In his editorial of May 9, 1903, the editor calls attention to "this new style Boston green goods circular," but he forgot to mention that Boston was circularizing the writings of "The Listening Key." However, he added this saving clause:

"Fortunately all these Bell attacks through venal newspapers, no matter how well disguised they may be in other directions, have certain well-defined finger marks that make their authorship clear even to the most foggy intellect."

So let us trace the "certain well-defined finger marks" in "Listening Key's" attack on "the fundamental principles" underlying the Independent telephone movement.

"In these diffuse and discursive talks on telephone rates it has probably occurred to many readers, if many readers have followed them them thus far, that the flat rate has been very hardly dealt with, bullied and teased to death, knocked on the head and put out of action and then often picked up again for another rap. Perfectly true, but there is some reason in this apparently inhuman and vindictive treatment."

Of course, "there is some reason." And in the language of the editor of the *American Telephone Journal* those reasons

"Will repay careful reading, not alone by people seeking instruction in methods of advanced criminal art, but as well by men who are interested in the development of Independent telephony, for they may have to meet this sort of green goods work at any time."

Now for some more "finger marks that make their authorship clear."

"When it has been urged in public discussions of the subject that the expense of telephone operating increased per telephone with the number of telephones in use the scoffers have said, with a jeer, "Then the more telephones you have the worse off you are!' Precisely so. Under flat rates, with a large area and a large traffic, that is absolutely true."

Knowing full well when he published that statement that the gentlemen who were endeavoring to promote the establishing of Independent plants in the larger cities already named had based all their plans on flat rates only, the editor of the *American Telephone Journal*

"is as much entitled to be ranked an Independent as any of the other gentlemen whom the Bell employs to fight modern telephone growth by bush methods."

Yet he continues to pose as an anti-Bell editor, while never ceasing to undermine every argument the Independent promoter is likely to use.

"Every big city is a London on a smaller scale, and especially, as regards the telephone, has the same set of problems to face, problems which are entirely different from those of the small town that can be served from a single exchange. In fact the latter has practically no problems at all; and just there is the reason why the telephone business has looked so easy and why so many people have been led astray in dealing with the telephoning of cities. A city of any size at all, even though very compact and condensed, covering an area of only a few square miles, can not be economically served from a single exchange because the average length of subscriber's line would be too great, and also because in a growing system the complication and expense of concentrating and operating all the lines in one central office would soon pass the limits of practicability."

"Listening Key" was too shrewd and worldly wise to select any large city in the United States to use in illustrating his arguments why telephone plants adopting reasonable flat rates as the source of income would prove losing investments. Well he knew that if he used Cincinnati as an example the Independents in Ohio and Indiana would turn and rend him in pieces. If he selected Milwaukee, Wisconsin would soon make the traitor hunt his hole. If New York had been used, Independents in the East would have raised a howl that would have been heard around the world.

"Listening Key" knew that. So he selected London. And as "we on this side of the water" are too busy to mind what goes on "across the pond," the deadly work went on under our very eyes. Thus we never realized how skillfully the whole Independent movement was being knifed to the heart until a friend called attention to it in November. Then TELEPHONY set to work to get the facts. And here is a portion of the substance of one circular sent out to influence investors in Cincinnati and Milwaukee:

"In the small place served by a single exchange the average distance traversed by the local telephone message is twice the average length of the subscribers' lines. The average length of the subscribers' lines is usually from a half to three-quarters of a mile, so the average length of line occupied by the local message will be somewhere between a mile and a mile and a half. In a large city the average length of the subscribers' lines will also be in the neighborhood of three-quarters of a mile, perhaps in certain cities where very tall buildings predominate and the density of subscribers within a short distance of the exchanges is consequently great, rather nearer

to half a mile than in the small place, where the subscribers are more scattered. But the large city, with its great area, must be served by a number of exchanges, seldom fewer than three or four, more often ten or twelve, and, in the case of London, as we have already mentioned, by something over forty. All those exchanges are joined together, each to every other, by trunk wires for the conveyance of traffic from one district to another, and it is common knowledge that in all large systems the great majority of telephone messages do go from one district to another, and only a very small minority are local to the exchange in which they originate.

"We see then that in the large system the average message necessarily traverses a greater distance than in the small system. We have no means of knowing what that distance is, for any particular city; in some it must be considerable. It will vary greatly as between different cities owing to a variety of factors, such as the area of the city, the contour of that area, the distribution of the population, the relative situation of the business and social centers, the habits of the people, the telephone development and so forth. We can only make a guess or an estimate based on what we know of the size and area of certain cities. In the case of London, as we have seen, there are exchanges within the area covered by the local service distant from each other as much as thirty miles. London is an extreme example to-day, but in the future there will undoubtedly be other cities as large as London is now, and as we are building for the future it is well to keep the extreme example in mind. At the present time there are other cities having exchanges certainly fifteen miles apart, and probably in many the maximum distance that a local telephone message may be sent is ten miles or more.

"Even with these figures, while they illustrate the great difference between the maximum distance traversed by a telephone message in a small single-exchange system and that available to the local message in a large system, we are unable to do more than guess at the average distance traversed by the message in the large system. There are no figures available on this point, and it is necessarily dependent on factors that vary in each place. Let us put it, for the sake of illustration, at three miles. That is only double the average distance traversed by the message in the small single-exchange system, and is doubtless well under the mark for most large cities; still it means that the average message in the large city occupies twice as much line plant for its accommodation as the average message in the small place. Consider this in connection with the average amount of traffic and it will readily be seen why the service in a city is so much more costly than in a small place.

"In the small place the average daily traffic per line will be five or six calls, say five for the sake of simplicity. In the large city it will be ten or twelve. In the small place let us allow an average distance of a mile and a half per message, which is liberal; in the city let us alow an average distance per message of three miles, which is conservative. In the small place, at five calls daily, the average number of minute-miles (taking three minutes as the average duration of a message) consumed by each subscriber daily will be $5 \times 3 \times 1\frac{1}{2} = 22\frac{1}{2}$, and in the large city the average number of minute-miles supplied daily to each subscriber, at a daily traffic of ten calls, will be $10 \times 3 \times 3 = 90$. The city subscriber consumes therefore four times as much service, measured in minute-miles, as the subscriber in the small place. As stated at Baltimore the other day, the city subscribers' traffic under flat rates steadily and rapidly increases, and the number of minute-miles he calls for is a steadily growing quantity. At Baltimore Mr. Bouton stated that many of his subscribers used the service to the extent of over a hundred calls a day, so the number of minute-miles supplied to one subscriber in a large city will mount up to the hundreds daily and may run into thousands. At flat rates the subscriber who uses hundreds or thousands of minute-miles daily pays the same price as is paid by him who uses only forty or fifty. But what is worse still, and makes the whole scheme of flat rates a losing proposition, unless the rate be fixed so high as practically to prohibit a large development of the system, is that the average use of minute-miles will steadily grow, while the rate remains stationary, so that the cost of furnishing the service must inevitably, sooner or later, overtake the price at which it is furnished.

"This is a fairly clear explanation of the famous old paradox that has always been a reproach to the telephone business among laymen—that the cost of the service per subscriber increases with the number of subscribers. When this proposition is advanced the layman says with a jeer, 'Then the more subscribers you get the worse off you are!' And the telephone man, as a rule, has not a very lucid explanation with which to parry that jeer, for as a rule he has been working on a safe margin of profit and until quite recent times the increase of subscribers has been so gradual that there was no risk of the jeer being anything more than a mere jeer—the chance hit of an ignorant critic which sometimes touches the spot. But Mr. Bouton has justified the jeer and proved its truth, for he has discovered that with a fixed flat rate and a rapidly growing system and steadily increasing traffic he was getting 'worse off' all the time. So much so that he was driven to state publicly that he must either raise his rates or arrest the development of the system. To such a point must any flat rate city system sooner or later come, since with the growing use of the service the amount of service—the number of minute-miles furnished to each subscriber—will inevitably in time cost the telephone company more to produce than the revenue it receives for furnishing it."

Every word in the foregoing will be found on page 29 of the *American Telephone Journal* of July 12, 1902. In the circular the paragraphs are arranged more attractively, making it easier for the layman to follow the argument. And the first paragraph of fifteen lines appearing in the *Journal* is omitted in that circular.

That our contention may not be misconstrued, we repeat that if that series of articles had borne the title of "The Danger in Flat Rates," and had been signed by Herbert Laws Webb, an ardent advocate of measured service rates, its reception would have been very different, and Independent promoters would have been on their guard and prepared to parry every argument capital advanced.

For the leading Independents in every state know that Mr. Webb is a Bell official, a fact Mr. Webb acknowledges with pride, and would have been prepared for the destructive character of his arguments. Yet the editor of the *American Telephone Journal,* well knowing "the business relations sustained by Listening Key," that for years he had been on the Bell pay roll, arranged for the publication of that series of articles in his journal, and allowed section after section to go out on their deadly mission without one note of warning or one safeguard.

Nevertheless that same editor, after editorially approving of the deadly work wrought by "Listening Key," had the dazzling audacity to appear before the members of the Inter-State Association at the recent Chicago convention and hold up his hands in holy horror because

"The Bell people employ such invidious methods in their effort to stifle competition that those of us who are engaged in the industry, and depend upon its success for prosperity, can hardly do the most commonplace thing without subjecting our action to the closest scrutiny in order to ascertain whether or not we are playing into the hands of the enemy."

Credulity in every phase is a crime. Did the editor of the *American Telephone Journal* assume that his readers would be so credulous as to believe that what Herbert Laws Webb wrote, or what any Bell official wrote under the disguise of "The Listening Key," would not "be influenced by their affiliations"? If so, what must that editor's opinion be regarding the standard of intelligence of Independents? And what about the gullibility of the officials of the Inter-State Association? Or does that editor's favorite phrase cover the case completely:

"Plus on est de fous, plus on rit"?

NEWS FROM AFAR.

The distribution of the principal news items of the day by telephone instead of in the form of a printed newspaper has often been predicted, and is now actually an accomplished fact, though on a limited scale only. M. W. Pershing, postmaster, and editor of the *Tipton Times,* Tipton, Indiana, U. S. A., controls a number of farmers' telephone circuits, which radiate in all directions from his office, and, in many cases, extend for a considerable distance into the surrounding country. Mr. Pershing receives the Indianapolis papers about 6 p. m., and, after abstracting and summarizing the principal contents likely to prove of interest to his subscribers, he calls the latter up by telephone, giving a simultaneous prearranged signal, which brings each farmer, anxious to learn the news of the day, to his instrument. Mr. Pershing then proceeds to retail to them the various news items which he has abstracted from the papers, including weather reports and market fluctuations. The verbal news system thus inaugurated is said to have become very popular among the surrounding farmers who have no other means of keeping in immediate touch with the rest of the community, and Mr. Pershing will probably have imitators.—*Electricity, London.*

Independent Telephone Companies

T. S. LANE, IN JAMESTOWN (N. Y.), HERALD

My attention has been called to an article in the Jamestown *Morning Post* of January 15, in reference to Independent telephone companies. Within a week this article has made its appearance in a dozen other newspapers in southern New York and inquiry develops the fact that this valuable news item emanates from the local Bell Telephone Company; was compiled by it, and is paid for by it as an advertisement. It is apparently a republication in one grand and glorious outburst of items from the same source which have made their appearance from time to time in the press during the past year, and all of which was paid advertising matter. A few failures of Independent telephone companies are noted, although to find them the Bell company has been obliged to go as far west as Montana and as far south as Georgia. Some of these failures have been advertised by the Bell company no less than thirty-seven times, from which it would appear that material for this style of advertising is somewhat scarce. It will be noted that the Bell company, in its advertising, makes no claims of superior service, but on the other hand confesses that it has not been equal to the occasion; has not been able to meet competition, and has permitted its competitors, the Independents, to occupy and develop territory in many sections of the country driving the Bell company entirely from the field. Apparently the Bell company seeks to induce the public to believe that all Independent telephone companies are or will be financial failures and that those who lend their support to such enterprizes are guilty of something closely approaching a heinous crime, or at least are lacking in sound judgment. In support of this contention the Bell company cites twenty-two instances of so-called failures of Independent companies, many of them insignificant. Of course it makes no mention of the 7,978 Independent companies which did not fail. In other words, accepting the statement of the Bell company as correct the percentage of failures of Independent companies is less than three-tenths of one per cent, which compares very favorably with any other line of business. No mention is made of the fact that in hundreds of instances the Bell company has been driven entirely out of business by the Independents.

There are numerous instances of this in Chautauqua county. Less than two years ago a business man in the town of Harmony made application to the Bell company at Jamestown for service. He did not get it and served notice on the Bell company that "if they were unable to give him service he would build a line from his residence in Harmony to Jamestown if necessary." This he eventually did, and from this beginning has developed a system of several hundred telephones in his neighborhood. At least two of the villages in this man's territory have since been abandoned by the Bell company, the latter not even retaining a toll station. In the village of Sherman, N. Y., the Bell company has just one telephone, while the Independents have nearly 400, the Bell service having thus been entirely supplanted. The Sherman company has for several years paid its stockholders annual dividends of from fifteen to twenty per cent. Similar conditions exist in Mayville, Westfield, Ripley, Brocton, Silver Creek and other Chautauqua county towns.

During the past two years nearly two thousand Independent telephones have been installed in the city of Jamestown, N. Y., and its suburbs. This is more than the Bell company has installed in the entire county of Chautauqua in its twenty years of active effort. In Jamestown there are about seventy-five telephone users served exclusively by the Bell company, while the Home Telephone Company serves 1,346 telephone users exclusively. Almost any business man in Jamestown having both telephones will testify to the fact that he receives ten calls from the Home telephone service to one from the Bell. When Jamestown business men come to the adoption of one telephone service it will not be Bell service, and when this choice is made the Bell company will have closed its career in Jamestown just as it is doing elsewhere in spite of its frenzied attempts to have it appear otherwise. Although representatives of the Bell company from the local manager down, presumably acting under instructions from headquarters, have made strenuous attempts to create a false impression as to Independent telephone companies generally and the Home Telephone Company in particular, even going to the length of repeatedly circulating false rumors reflecting on the financial stability of the Home Telephone Company, it is doubtful if any official of the New York & Pennsylvania Telephone & Telegraph Company (Bell) would care to make a statement over his own signature reflecting on the financial stability of the Home Telephone Company of Jamestown. After all it is the situation in Jamestown which interests Jamestown users of telephones and not the condition of affairs in Custer County, Montana, or Barnesville, Georgia.

Twenty-five manufacturers of furniture have failed in Jamestown and yet it does not follow that this prosperous industry is a failure. Bank failures are of daily occurrence, yet no one pretends to proclaim that the banking business is extra hazardous. The telephone business is in many respects not unlike other lines of business. Like other lines of business the telephone proposition properly financed and managed invariably meets with success, but it may be ruined by poor management in just the same manner and for the same reason that a bank or a grocery store may be wrecked. The Independent telephone companies have long since ceased to pay much attention to the Bell company. The bug-bear of Bell competition (the supposed bulletproof octopus of unlimited resources) has not proven what it loudly proclaimed to the world that it was, but has shown a surprising weakness in meeting the competition of the Independents. The financial troubles of various Bell companies are well known and their "unlimited resources" exist largely in the imagination. The Independent companies are developing the field according to their own methods, which are diametrically opposed to Bell methods, and it is left for the Bell company to resort to unfair means in competition.

As a matter of fairness it may be stated that not all Bell companies are failures. There are a large number of Bell companies throughout the United States independently organized, financed under different plans and varying widely in methods. One Bell company is credited with having paid to its stockholders two thousand per cent in dividends. This company seems to have been well managed and financed On the other hand the Michigan (Bell) Telephone Company, which was the Bell company occupying the state of Michigan as its territory, recently went into the hands of a receiver and was sold under the hammer for fifty per cent of the amount of its mortgage, giving as a reason for its failure that it could not stand the competition of the Independents. This Bell company seems to have been badly managed as the Independents operating in the same field have been and are now prosperous.

Although larger interests were involved in this single

Bell failure than in all the Independent failures cited by the Bell literary bureau, it does not follow that the telephone business, representing in round numbers $100,000,000 is a failure as a whole.

The New York & Pennsylvania Telegraph & Telephone Company (Bell) is one of the most conspicuous instances of Bell mismanagement. This company was one of the last of the Bell companies to encounter Independent competition and, having plenty of time to study the methods of the Independents in other parts of the country, it was expected that this company would hold its own against competition. The methods of the New York and Pennsylvania Company in meeting competition have disclosed a weakness in its organization, management and finances which is a surprise to its competitors and has aroused the wrath and condemnation of the holders of its securities. As one of the latter recently remarked, "a wooden man could manage it better."

The methods of the New York and Pennsylvania Company in meeting competition have been either crude and blundering or so far outside the pale of legitimate competition that its efforts to injure the Independents have elicited only amusement and contempt from the public. Its method of traducing its competitors by the medium of such newspaper articles as the one under discussion has cost it both friends and business.

The New York and Pennsylvania Company has violated the recognized decencies of competition in its frantic endeavor to prevent the success of a legitimate business rival. In so doing it has employed libelous statements and conspiracy as weapons of attack. In the paid advertisement under discussion, the Bell company claims that it has not reduced its rates for service. This statement will be read with interest by about 200 of its Jamestown subscribers who have Bell residence service, at a cost of one dollar per month or less. Four hundred others can testify to the fact that they have Bell service practically free. Any intelligent observer knows that it is entirely easy to secure Bell telephone service in the city of Jamestown at very much lower rates than those prevailing two years ago and any assertion to the contrary is too ridiculous for serious discussion. It is probable that no one will attribute this reduction in rates to philanthropy on the part of the Bell company. Nor is it mere accident that the Bell company's rates for long distance service have been materially reduced coincident with the advent of competition. The completion of the toll line system of the Inter-Ocean Telegraph and Telephone Company (Independent), which affords the Independent companies of western New York a comprehensive toll line service, has left the Bell company with an argument to offer in favor of the service.

The fact is, the original Bell company and its numerous subsidiary companies—the main devilfish and its tentacles—have for many years enjoyed an immensely profitable monopoly the overthrow of which, in many places accomplished and everywhere impending, has brought wrath, terror and dismay into that company's ranks. The series of puerile putty balls which the Bell's warriors have discharged through the newspapers for a year represent the futile efforts of a forlorn hope. This is the real motive. If, however, any person prefers to believe the Bell's purpose to be humanitarian rather than selfish, that the company is solely actuated by a high resolve to save possible investors in Independent telephone properties from financial loss, and to protect the business world from the disaster certain to follow the use of two telephones at the price of one instead of one (the Bell) at the price of two—if any person over seven years old feels this way about it I am content.

There are in round numbers 3,500,000 telephones in use in the United States. Their use has increased ten fold in the past six years. There are nearly 250,000 telephones in farm houses.

CONVENTION OF WISCONSIN TELEPHONE COMPANIES.

The annual convention of the Independent telephone companies of Wisconsin will be held at Milwaukee on February 10 and 11, 1904. The Wisconsin association is one of the strongest of the state organizations and its meetings have always been a success. The question of an Independent exchange in Milwaukee will be taken up and plans formed for carrying out this undertaking. Other matters of great importance to Wisconsin companies will be discussed and an effort made to secure the co-operation of all the companies in dealing with these problems. Some of the prominent telephone men of neighboring states will take part in the program. The more important telephone manufacture and supply houses have arranged to make displays of their apparatus. The convention headquarters will be at the Pfister Hotel, and the sessions will be held in the hotel convention hall.

TAKING PLACE OF SOLICITOR.

The telephone is rapidly taking the place of the solicitor after local business. Instead of the runner who goes from house to house to drum up trade for his employer, the telephone is being used by many of the larger merchants who have especially engaged employes to keep the wires hot in their search for new business and in supplying the wants of old patrons. And the plan is working admirably. Many a merchant receives more orders through his telephone than come in over the counters. A Chicago man has built up a thriving business in this way. Instead of sending solicitors out each morning to the residences of desirable customers, he employed a couple of bright, intelligent young women to solicit orders over the telephone and to carefully enter all telephone messages. He now says that these two telephone clerks soon had a greater volume of business entering his establishment than any of his competitors could control. But he never made the mistake of having his clerks use both telephones at the same time for outgoing calls. He endeavored to always have one telephone door open so that customers could enter and make known their wants. And his instructions to every one in his employ are: "Responding promptly to a telephone call is only common courtesy; and courtesy, even to a telephone caller, may pay a very handsome profit."

TO ENCOURAGE INDEPENDENT PLANTS IN ALASKA.

Representative Cushman believes that the building of telegraph and telephone lines in Alaska by private enterprises would follow the passage of a bill which he introduced in the House of Congress on January 12, granting the rights of way for such lines. Mr. Cushman's bill for this purpose is as follows:

"That the secretary of the interior be, and he is hereby, authorized and empowered, under general regulations to be fixed by him, to permit the use of right of way through the public lands and reservations, for whatsoever purpose established, in the district of Alaska, by any individual or association of individuals who are citizens of the United States or who have declared their intention to become such citizens, or by any corporation organized under the laws of the United States, or of any territory or state, for telegraph or telephone purposes, to the extent required for the construction, maintenance and care of such line, not exceeding twenty-five feet on each side of the center line thereof: Provided, that such permits shall be allowed within or through any reservation only upon the approval of the head of the department under whose supervision such park or reservation falls, under such conditions, limitations and re-

strictions as may be deemed proper, and upon finding by him that the same is not incompatible with the public interest: Provided, further, that all permits given hereunder for telegraph and telephone purposes shall be subject to the provisions of title 65 of the Revised Statutes of the United States, and amendments thereto, regulating rights of way for telegraph companies over the public domain, said laws being hereby made applicable to such telegraph and telephone lines.

"That within two years from the date of such permission the telegraph or telephone lines authorized shall be completed and actually used for the purpose contemplated by this act; but if the permission given to any applicant shall involve more than 200 miles of line, then 200 miles shall be completed and actually used during the first two years after the date of such permission, and 100 miles thereof in addition during each subsequent year. If such right of way be abandoned, or if no substantial work be done thereon in good faith during two consecutive years, all rights under said permission shall be at an end, and the land shall not thereafter be subject to such right of way, no further act on the part of the United States being required. If it shall be shown to the satisfaction of the secretary of the interior that the parties have in any way failed to prosecute the enterprise in good faith and with due diligence he may at any time revoke such permission.

"That upon the filing of satisfactory evidence of the completion and use of the lines within the time allowed the secretary of the interior shall confirm such permission as an easement. If such easement shall at any time thereafter be abandoned, or if it is not used in good faith for the purposes authorized for three consecutive years, such easement shall be at an end, and the land shall not thereafter be in any way subject thereto, no further act on the part of the United States being required. There is hereby reserved to the secretary of the interior the right to revoke, amend or suspend such permission or easement upon satisfactory showing made to him of any violation of law or the regulations made in pursuance thereof, or of any injury done or likely to be done within any reservation."

A Convenient Galvanometer

WALTER P. WHITE in the Physical Review

This instrument is the result of an attempt to design a galvanometer for elementary work. The requirements set were: that it should be reliable, accurate, quick-acting, direct reading, portable, and capable of being constructed in the humblest high school laboratory. The result seems to justify the expectation that the instrument may prove useful in advanced, as well as elementary, work. Comparing it with the Weston milammeters, it is at least as accurate, can be read as quickly and easily, and has the same resistance for a given sensibility. It has the disadvantage that its indifference to outside magnetic disturbances, though great, is not complete—on the other hand, it costs far less than a good commercial ammeter, and has other less fundamental advantages.

No one feature of the galvanometer is new—indeed, the combination is, in a general way, such as follows naturally from an application of the reflecting principle in a field where an adherence to the old-fashioned tangent galvanometer type with needle and pointer has effectually prevented the development of satisfactory instruments. The reflecting galvanometer, on account of the smaller deflection used and the greater radius of the scale, does not require so careful centering of the needle, and hence a simple instrument is in this respect as good as a very expensive galvanometer with a pointer. The short needle is more quick acting. The shortness of the needle and the smaller deflection combine to give a small displacement of the poles of the needle; the diameter of coil necessary to make the instrument obey the tangent law is thus very much reduced, and from this fact follow several advantages. First, it becomes convenient to use a movable magnet system of two needles, with poles oppositely directed, such as are universally employed in sensitive astatic galvanometers. The fact seems to be often overlooked that this arrangement is valuable for securing freedom from magnetic disturbances in less sensitive instruments also. The use of this kind of a magnet system, which by itself would be astatic, requires, of course, the addition of a control magnet. Second, the small coil renders it possible to make the resistance several hundred times as small, for the same sensibility. In practice, it is better to sacrifice some of this gain and make the coil more powerful, correspondingly increasing the magnetic control. In this way we keep the needle under the action of comparatively strong forces, and thus obtain a freedom from the action of convection air currents inside the case which is quite as important as freedom from magnetic disturbances.

Freedom from both magnetic and mechanical disturbances is thus promoted by the use of a control magnet. In addition, such a magnet renders it very easy to regulate the sensibility of the galvanometer so that the reading is given directly in some accepted unit. A third advantage is that constancy which can be secured in a modern laboratory only by being independent of what is by courtesy called the earth's field. The ability, also, to use the instrument in any desired position regardless of the points of the compass is often a decided advantage. This advantage is limited, however, by the fact that the absolute sensitiveness varies by a fraction of one per cent in different orientations.

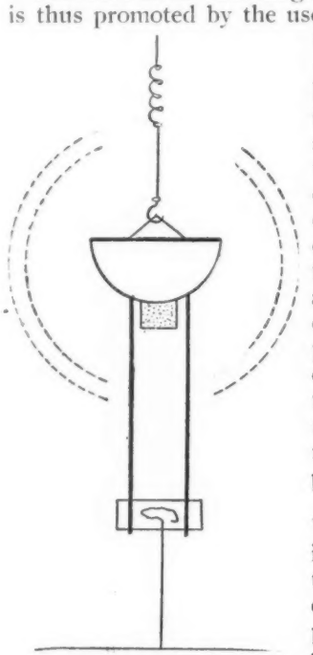


FIG. I.

For the magnet system the Weiss form has been selected, in which there are two vertical needles, each end of the combination having two unlike poles, belonging to different magnets, but acting like the two poles of a horizontal magnet whose length is equal to the distance between the two needles. Such a system has practically permanent astaticism, and is far easier to construct than the usual form, especially for a novice. The needles actually used are 1.2 mm. thick and 43 mm. long, placed 8 mm. apart (see Fig. 1). The weight is about a gram, which gives stability. The astaticism is so good that, with the control magnet producing a field equivalent to about eight times that of the earth exerted on each pole, the maximum disturbing effect of the actual earth's field usually causes a deviation of about fourteen minutes of arc. Better results might be obtained, for the assembling of each system took only two or three minutes, and consisted in laying the needles, as nearly parallel as could be judged by the eye, on two strips of mica, and

fastening them there with sealing wax, applied with a warm nail. It would require, however, considerable skill and more patience to approach the above result by building up a system of the ordinary type.

The damper is a horizontal wire, 4cm. long, turning in a shallow layer of clean kerosene. Air and magnetic dampers are out of the question for portable galvanometers with fiber suspension, on account of the very small clearance required if they are to be effective. The damper here described, however, is more than a mere substitute. It is in many respects preferable even for stationary instruments. It is easier to make, never requires adjustment, is not disturbed by dust or displacements of the galvanometer, and suffers far less from convection currents than an air damper.

That the old fashioned type of tangent galvanometer has often been preferred to the cheaper, more accurate, and more efficient mirror galvanometer is perhaps, mainly due to the following reasons: The slowness of the reflecting galvanometer when damped in the usual way; its greater sensitiveness to disturbances (when used in the "earth's field") and the trouble that fiber suspensions give by breaking. It has just been shown that the two first considerations are altogether in favor of the mirror instrument, when it is properly made; the third difficulty has been avoided by hanging suspension from a small spring, which weakens the effect of shocks, and by using a bundle of eight silk fibers instead of one. The torsion of such a bundle, 1 cm. long, produces an altogether negligible error. (It may be worth while to call attention to the fact that it is not the amount of the torsion, but the extent to which its effect varies from that of an approximately equal amount of magnetic control, which determines the error in an empirically calibrated instrument.)

In order to make the galvanometer direct reading, the scale is bent to a curve such that distances measured along it are proportional to the tangent of half the angle subtended. When a template has once been made it is as easy to make such scales as to make straight ones. A board can be sawed in two along the proper curve and then screwed together again, clamping one edge of a flexible scale in the cut. An error of as much as a millimeter in the saw cut causes an error in the scale readings which is inappreciable, even when the scale distance is only 25cm. To obtain the proper curve, a circular arc, *MAN*, Fig. 2, is described with radius, *OA*, equal to the proposed scale distance; radii are drawn two degrees apart; these radii are extended beyond the circumference as follows:

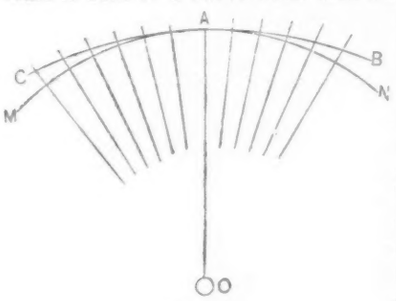


FIG. 2.

At	2	4	6	8	10	12	14	degrees from *A*
Add	.0002	.0008	.0021	.0036	.0055	.0085	.0108	of the radius.
At	16	18	20	22	24	28		degrees from *A*
Add	.0143	.0183	.0227	.0274	.0327	.0440		of the radius.

A smooth curve, *CAB*, is drawn through the points thus located. The readings will be proportional to current with uniform scale divisions of any length. The zero must be at *A*, and the scale distance equal to *OA*.

These numbers were determined by triangulation, using six-place tables. Three different systems of triangulation gave concordant results.

The scale is read by the double mirror system. A small stationary mirror, either below and behind or above and in front of the swinging one, gives an image of a line somewhere on the scale. If the mirror nearest the eye is thin, this line appears to come close up to the scale as seen in the mirror, and thus serves as an index. Since the eye is in focus for both images at the same time, this arrangement dispenses with a telescope. At 25 cm. scale distance, divisions 2 mm. long can be read to tenths. A telescope is decidedly preferable, however, for those who have learned to use it without undue effort. With a telescope 13 cm. long one can with much greater ease read millimeter divisions, thus doubling the range of the instrument.

There are two coils of the Helmholtz type, each 4 cm. in diameter. The ratio of magnet length to coil diameter is thus 1:5. With this ratio, and with each half of the scale subtending an angle of 28°, the greatest possible error due to irregularity of the field is about 1/2.000 of the length of the scale.[1] Fig. 1 shows the magnet system with suspending spring and fibers, hemispherical mirror, and damping wire, full size. The upper piece of mica is behind the mirror. The dotted circle shows the size of the coils, and the small dotted squares shows the position of the stationary mirror. For a sensibility of one milliampere there may well be twenty turns in the coils, which should have a resistance not over .1 ohm.

The writer has used one of these instruments for a great variety of work. Its coils have 160 turns, 3 ohms resistance, and the reading is in tenths of milliamperes, with shunts for milli- and centiamperes. A calibration showed no error greater than .001 the length of the scale. The instrument is not necessarily quite as accurate as this, since there may have been errors in reading, or in the standard resistances, greater than any observed—still, an instrument whose inaccuracy cannot be detected through the use of a good resistance box is good enough for many kinds of work. Even more gratifying than the accuracy, however, are the quickness and the certainty of the readings, which, in comparison with the generality of even excellent galvanometers, are very striking.

Most of the features above described are already familiar in other instruments, or are such that their advantages can be readily estimated. A fluid damper, however, seems often to be considered liable to cause large errors through surface tension effects.

Otherwise, such dampers would prove valuable—they are practically indispensable in a portable reflecting galvanometer and would greatly improve many existing instruments, to which they could be easily applied. To test the magnitude of the surface tension effects, a magnet system was observed in which they were made 2,500 times as great as need be, by making the damper attachment very eccentric, and by moving the wall of the containing vessel to and fro through a space of 8 mm., which gives 64 times the variation of distance that would occur with a damper centered to within .5 mm. and turning through an angle of 14°. Not the slightest effect was observable in a telescope half a meter away. The magnet system weighed 40 gm., and its time of vibration was .25 second. Increasing the time to seconds would make the system 1,600 times as sensitive to disturbances, but the substitution of a well-made damper would evidently more than offset this. We may say, then, that the surface effect may

[1]Half this error is that inseparable from a perfect Helmholtz galvanometer, and the other half is the error which would result if the true distance of the coils were one millimeter in error. (There is an even chance that the two errors may oppose each other.) The unavoidable error varies approximately as the fourth power of the ratio of magnet length to coil diameter, the other, as the square of this ratio, and also as the square of the ratio of the error in distance to the coil diameter. Hence if the diameter of the coil is increased the gain in accuracy will be as the fourth power of the ratio of increase, but if the magnet is made shorter the gain will be something more than the square. "Error" here means, as is appropriate for an empirically calibrated instrument, the greatest discrepancy between readings, which is far less than the variation from the reading of a very short magnet, the quantity which is given in the usual formulas.

be made negligible for any magnet which is heavy enough to need such damping at all. The fluid in this case was ordinary kerosene, and the diameter of the containing vessel, 7 cm. The necessary diameter can readily be found by trial in any particular case. A horizontal wire is better than a vane, in that it allows the use of a very shallow layer of fluid. Convection currents are much smaller in such layers, and waves, if any occur, are more quickly damped out.

Properties of Hard Drawn Copper Wire.

FRANCIS W. JONES IN TELEGRAPH AGE

The great strength which is obtained in hard drawn copper wire (of over 60,000 pounds breaking strain to the square inch, which is very close to ordinary iron), with over six times better electrical conductivity than iron, with its almost complete immunity from oxidation and corrosion, ensuring a negligible depreciation, and its small electromagnetic inertia as compared with iron, are qualities which have made the use of copper wire very important to telegraph and telephone companies, and to meet the necessity of systems of communication requiring more rapid signals than Morse, the value of copper wire to telegraph companies for overhead construction will still be very greatly enhanced. But the full value of such wire, particularly its mechanical qualities, can only be secured by its most intelligent and careful construction and maintenance, from the fact that the strength of the wire lies entirely upon its surface, and that to secure the utmost tensile strength the wire has to be tempered to the verge of brittleness.

When telegraph wires were first strung upon poles, the length of the spans, the distance of wires apart, and the sags given, were decided purely by mechanical and financial considerations. The length of span having been fixed to require as few poles per mile as possible, the sag was restricted to such a distance that the wires would not swing together in the wind. Modern construction has been determined largely by the same consideration. An exception was made by the American Rapid Telegraph Company and the original Postal Telegraph Company, several years ago, in placing their wires farther apart to obviate the effects of electrostatic lateral induction, but on the discontinuation of the rapid systems then used by these companies, the intermediate space on the cross arms was used for other wires, and within recent years the tendency has been to place the wires still closer together, and this has become possible by reason of the shortening of the spans by a greater number of poles necessary to support the increasing load of wires.

Notice was early taken by engineers of the temperature effect upon wires, as it was found that when they were put up in a high temperature, with but little sag, that they would snap during cold weather, so the engineers furnished formulæ according to which sags should be given to wires of different lengths of span when erected at various degrees of temperature.

It is shown by Mr. John Gavey, the engineer-in-chief of the British Postal Telegraphs, page 336, volume thirty-one, of the Journal of the Institution of Electrical Engineers, London, that a hard drawn copper wire, when under a very slight stress, acquires a permanent set if the stress be maintained sufficiently long, and that a wire nearly No. 12 B. and S., with a breaking strain of 490 pounds, loaded with 110 pounds, recovered its original length upon removal of the load if it was not continued too long, but if the load was kept on for twenty-four hours a permanent elongation of one-sixty-fourth of an inch in three days and three-sixty-fourths of an inch in two weeks. It is shown that hard drawn copper wire will not respond to its natural elasticity after being loaded for a few hours, and that the elasticity has been killed, so to speak, or the wire fatigued and its natural elasticity disappears.

I erected on May 7 last a new No. 9 B. & S. hard drawn copper wire, between fixed supports, 124 feet 1 inch apart, with a sag of four inches, which equaled a stress of about 231 pounds, or roughly one-third of the breaking strain of the wire. The temperature at the time was sixty-five degrees Fahrenheit. On July 10, temperature 102 degrees Fahrenheit, the sag was eleven and one-eighth inches, and later in the day, at ninety-three degrees Fahrenheit, the sag was nine and three-eighths inches. On August 6, at a temperature of sixty-five degrees Fahrenheit, the same as when the wire was erected, it showed a sag of nine inches, or five inches in excess of the sag that was given it when first put up. A new hard drawn copper wire has a natural elasticity which permits it to elongate a very trifling amount (about one-tenth of one per cent), when under not exceeding two-thirds of its normal breaking strain for a short period of time, but when the strain upon the wire, or the period of time increases, then the wire permanently elongates.

When a short piece of the wire has been placed under stress to the limit of the breaking strain, of about 670 pounds, for a No. 9 B. & S. gauge, it breaks, and the two pieces measured will be found to have sustained a permanent elongation which, according to the temper of the wire, generally ranges between one and two per cent, and a piece of the wire, 150 feet long, when subjected to a strain of 670 pounds, at the same rate of elongation, would stretch from eighteen to thirty-six inches before breaking. If such an elongation were possible to take place between telegraph poles, it would allow the wire a sag of nine feet or over. Hard drawn copper wire may be permanently elongated nearly up to its maximum limit of elongation, and it will require as much strain to break such a piece of elongated wire as if it had never been stretched.

What actually happens, therefore, seems to be this: Suppose a wire, when new, is given a sag of nearly seven and three-quarter inches, between poles 150 feet apart, at eighty degrees Fahrenheit, the wire then has a stress of about one-quarter of its breaking strain and the length of the wire is 150.0072 feet. Should the temperature fall sufficiently, this wire will contract so that it will be subjected to a very heavy strain which will cause it to elongate unless the wire contains weak spots or kinks or places that have been slightly abraded or indented at the tie wires, in which case the wire will break at such weak points.

When this is the case the weak spots in the wire will, of course, prevent it from becoming permanently elongated beyond what it naturally elongates upon the poles, as demonstrated by Mr. Gavey. Should the wire have no unusual weak spots it will elongate sufficiently to prevent the stress in the wire raising to its breaking point. It is evident that if linemen were to adopt the practice of taking up the sags by cutting out pieces of wire, that the time would soon arrive when the wire had stretched to the limits of its natural elongation and would break under the first stress imposed by low temperature or other cause.

The Russian and German postoffices have arranged to construct a telephone line between Berlin and St. Petersburg, via Edtykuhneu, on the German frontier, and Wilna, in Russia. The construction will begin in 1904.

PERSONAL

Capt. W. L. Candee, joint manager of the Okonite Company, has returned from a short trip to Europe.

G. Y. Stamp of Melrose, Kentucky, has bought the telephone exchange at Stithton, Kentucky, formerly owned by H. W. Bryant.

W. F. Richardson, formerly assistant manager of the John A. Roebling's Sons Company's branch at Cleveland, Ohio, has been transferred to the San Francisco headquarters.

W. A. Booth, P. B. Davis and G. M. Cornett have formed a company with a capital of $10,000 to build sixty miles of telephone lines between Prineville, Bend and Sisters, Oregon.

W. S. Chase, sales manager of the National Acme Manufacturing Company, Cleveland, Ohio, took passage January 16 for England and the continent on a business trip to cover about two months' time.

J. A. Gordon, formerly connected with the electrical engineering department of the Sterling Electrical Company of Lafayette, Ind., has resigned to take charge of the properties of the Lipton Telephone Company, Lipton, Ind.

Prof. F. B. Crocker of the electrical engineering department of Columbia university, New York city, has sailed with Dr. M. I. Pupin for a short winter trip in Mediterranean waters, proposing to be back by the end of February.

W. T. Jackson, western representative, was recently in Chicago on an extended trip throughout the west, in the interests of G. M. Gest, the contractor of Cincinnati, New York and Boston. While here, Mr. Jackson paid his respects to TELEPHONY.

Arthur W. Hoge of the Ideal Construction Company, Lima, Ohio, was married December 30, 1903, at Morristown, Ohio, to Miss Lizzie Milner Day. Mr. and Mrs. Hoge will be at home after January 30, 1904, at Hopkinsville, Kentucky.

Chas. W. Zahm, engineer of the Empire Construction Company of Toledo, recently visited Chicago, Detroit and his home city. Mr. Zahm is now engaged upon construction work at Los Angeles and will return to California by way of New Orleans.

The International Telephone Mfg. Company of Chicago has secured the services of Geo. H. Pierce, who formerly represented the Stromberg-Carlson Company in New York and New Jersey. Mr. Pierce will cover the state of Iowa with headquarters at Des Moines.

H. M. Deavitt, analytical and consulting chemist and assayer, with a large practice in Chicago, has taken the management of the Chicago office of the Engineering Company of America, 159 La Salle street. Mr. Deavitt recently visited New York in his company's interests.

George Finch of Escanaba, Michigan, owner of the Finch Independent telephone system, will extend his toll lines from Delta county to Menominee and Cedar River. Mr. Finch also intends to apply for a franchise to build a telephone system in Menominee in opposition to the Bell.

H. C. Hackney, formerly with the Standard Telephone and Electric Company, Madison, Wisconsin, has associated himself with the Stromberg-Carlson Telephone Manufacturing Company. Mr. Hackney's headquarters will be at Rochester, New York, and he will represent his company in the New England states.

H. L. Shippy of John A. Roebling's Sons & Company, who has recently been ill with appendicitis, has recovered and has so far convalesced as to be able to visit his office. For his friends his return to health and strength has been one of great pleasure and all have joined with special heartiness in wishing him a happy New Year.

E. E. Webster, formerly general manager of the Twin City Telephone Company, St. Paul and Minneapolis, is now manager of the Independent Telephone Company of Seattle, Washington. Mr. Webster has added nearly 1,000 new subscribers to his present system since assuming the management of the company last November.

A. Frederick Collins has recently prepared three contributions for the Encyclopedia Americana of the *Scientific American* on telegraphy, wireless telegraphy and wireless telephony. He has also been a contributor to the International Encyclopedia on wireless telegraphy. Some of his recent "popular" work for the *New York Herald* has been excellent.

Dr. L. Hathaway, of Reinbeck, Iowa, has a telephone instrument which he carries in his buggy. If he wishes to telephone to the office or to any of his patients when in the country all he has to do is to drive under a telephone wire by the roadside and fastens a jointed wire to the wire above and in an instant has connection and can talk anywhere and to anyone within a radius of fifty miles.

W. E. L. Gaine, general manager of the National (Bell) Telephone Company of Great Britain, accompanied by Mr. Frank Gill, engineer-in-chief of the National (Bell) Telephone Company of Great Britain, is making a tour of the United States, inspecting telephone exchanges. The gentlemen were in Chicago recently in company with Herbert Laws Webb, who now makes his headquarters in London.

G. W. Leyda has taken the management of the Evansville (Wis.) telephone exchange, to which place he has moved his family. Mr. Leyda comes from the tri-cities, Davenport, Rock Island and Moline, Illinois, where he spent several years in various positions with the Bell company. Previous to going to Evansville he was connected with Independent interests in the tri-cities, and his many friends wish him every success in his new field.

Winfield Scott, a farmer, of Anderson, Ind., president of a rural telephone company, has devised a signal for all patrons of his system in case that some one on the line is in distress or in need of help. Six long rings, followed by a short pause, and then six short rings, will mean to attract all parties on the circuit. Following the general alarm signal, the operator at the central station will then give the number of rings indicating the party at whose home there is need of assistance by neighbors. President Scott says that in case of fire, or a serious accident, or a person injured, a robbery, or something alarming, all persons on the circuit can be advised, and it is asked of all subscribers on the lines to respond to the alarm signals as quickly as possible.

THERE ARE OTHERS.

The Moville Citizen says that in that town lives a young man who has never spoken an unkind word to family or friend. He never spoke a falsehood nor indulged in any conversational gossip about his neighbors; never used profane language nor indulged in the sinful practice of politics. He is the deaf mute—Harry Phillips.

That's nothing, we have a man in Anton who never hugged a hired girl, chewed or smoked, saw a passenger train, recognized a friend, wore a pair of shoes, ate a square meal, slept a wink or laughed out loud. It is the "dead man" that holds the south pole of the telephone exchange on Second avenue.

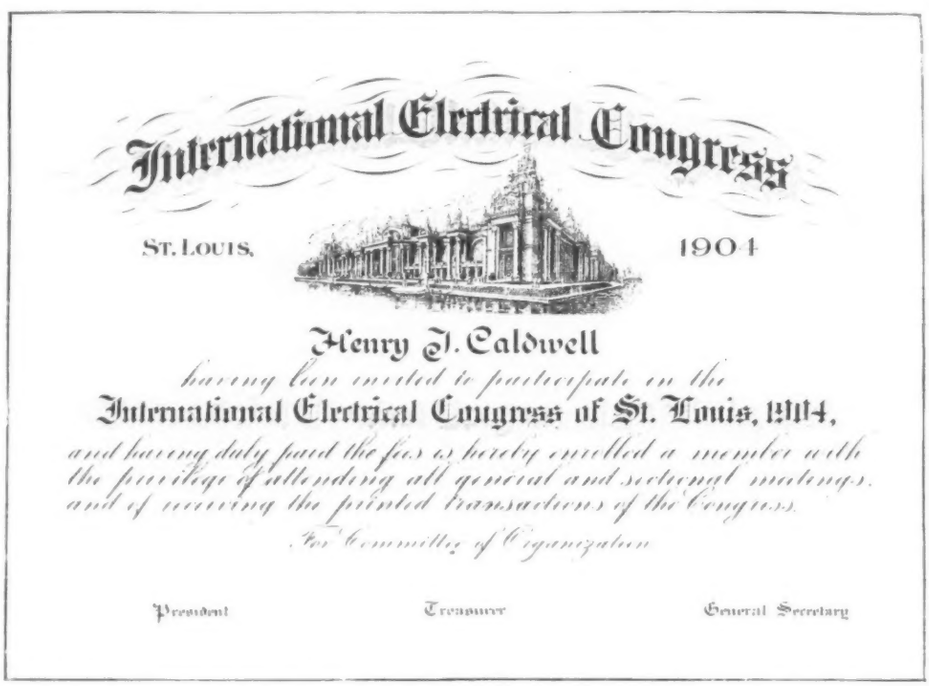
Enclosed find draft for $1.00 to renew my subscription to TELEPHONY. I am taking six telephone journals, but TELEPHONY has first place on my desk.—J. Sanford Buck.

International Electrical Congress of St. Louis

A. E. KENNELLY

According to the present indications the International Electrical Congress to be in session at St. Louis, September 12-17, 1904, will be one of the most successful that has yet been held, both with respect to the number of adhesions and to the value of the transactions.

Up to date about 3,550 circular letters of invitations to join the congress have been issued to persons or associations in North America. From these 875 postcard acceptances of membership have been received. About 350 similar circular letters of invitation have been recently sent to other countries. It is intended to issue in all about 5,000 invitation circular letters in America and about 6,000 in foreign countries. It is expected that many persons will join the congress, both in America and abroad, who do not expect to attend the sessions in St. Louis, in order to secure a copy of the transactions, which will form one and perhaps two large octavo volumes. Collection of fees has commenced, and upon receipt of a fee the member will be forwarded a certificate of membership. The certificate is eight and one-half inches by eleven inches in size and printed on heavy paper of excellent quality. A miniature replica of this certificate, without the signatures, is shown herewith.


International Electrical Congress
ST. LOUIS.
1904
Henry J. Caldwell
having been invited to participate in the
International Electrical Congress of St. Louis, 1904,
and having duly paid the fee as hereby enrolled a member with the privilege of attending all general and sectional meetings, and of receiving the printed transactions of the Congress.
For Committee of Organization
President
Treasurer
General Secretary

Recently 280 special letters of invitation have been issued on behalf of the committee of organization to prominent electricians and electrical engineers, signed by the president and the general secretary of the committee, requesting papers for the congress in the various sections. Of these 146 have been sent to foreign authors and 134 to American authors. There has not been time to receive replies from more than a few foreign authors, but twenty-one acceptances have up to date been received from abroad, and forty-six acceptances from North America. Sixty-seven papers are thus already promised for the congress, and the number is steadily increasing. A considerable further number of invitations to contribute papers have yet to be issued. It is hoped that the congress will convene with a full program in each section, and that at least half of the papers may be from foreign countries. According to the plans of the committee, papers for the congress program are specially invited, but papers voluntarily offered will be submitted to the officers of the sections to which the papers belong, and may be included in the program by invitation at their request, if the subjects are desirable, and if the schedule allotted to each section will permit, it being the desire of the section officers to secure and offer the best possible program and presentation.

Petitions from the congress committee of organization and from the president of the American Institute of Electrical Engineers have been filed with the department of state at Washington, through the department of commerce and labor, and the National Bureau of Standards, urging that the various foreign governments should be invited to appoint official delegates to the congress. The lists of such delegates to be invited are in accordance with the lists allotted to the various countries at the Paris congress of 1900 and the Chicago congress of 1893. Including the United States, the lists comprise fifty-six official delegates. Information has been received that these petitions have been granted and that the state department on the 17th of December, 1903, instructed the diplomatic officers of the United States abroad to extend an invitation to foreign countries to be represented at the congress by delegates.

Arrangements are being made with a view to perfecting plans of co-operation between the congress and electrical societies and associations in various parts of the world. Invitations have already been extended to the congress members to visit places of electrical interest on the journey to or from St. Louis.

The committee of organization of the congress consists of Elihu Thomson, president; A. E. Kennelly, general secretary; W. D. Weaver, treasurer; Bion J. Arnold, vice-president and chairman of executive committee; C. F. Scott, Dr. S. W. Stratton, Prof. H. S. Carhart and Prof. W. E. Goldsbrough, vice-presidents.

The following section officers have been appointed by the president and have already done much work in organizing their sections:

SECTION A—GENERAL THEORY.

Prof. E. L. Nichols.....Cornell University
Prof. H. T. Barnes.....McGill University

SECTION B—GENERAL APPLICATIONS.

C. P. Steinmetz.....Schenectady
Prof. Samuel Sheldon.....Brooklyn

SECTION C—ELECTRO-CHEMISTRY.

Prof. H. S. Carhart.....University of Michigan
Carl Hering.....Philadelphia

SECTION D—ELECTRIC POWER TRANSMISSION.

Mr. C. F. Scott.....Pittsburg
Dr. Louis Bell.....Boston

SECTION E—ELECTRIC LIGHT AND DISTRIBUTION.
Mr. J. W. Lieb, Jr.....New York
Mr. G. S. Dunn.....New York

SECTION F—ELECTRIC TRANSPORTATION.
Dr. Louis Duncan...Massachusetts Institute of Technology
Mr. A. H. Armstrong.....Schenectady

SECTION G—ELECTRIC COMMUNICATION.
Mr. F. W. Jones.....New York
Mr. Bancroft.....Gherardi, N. Y.

SECTION H—ELECTRO-THERAPEUTICS.
Dr. W. J. Morton.....New York
Mr. W. J. Jenks.....New York

Bell Telephone Methods in Canada

A Discussion Before the Union of Canadian Municipalities.

Some idea of the Bell methods in Canada may be had from the report of the Union of Canadian Municipalities, which union at its recent convention at Ottawa handled the Bell crowd without gloves, as evidenced from the following report of its deliberations on telephone legislation:

The Acting Chairman.—The next item on the program for consideration is the subject of telephone legislation. This is one of great importance to the union, and I am sure there is considerable to be said on the subject, and if any of the gentlemen has a motion to make in order to open the discussion, it would be in order to do so now.

Dr. Anthony Ochs (Reeve of Waterloo County) moved: "Whereas, At the present session of Parliament, it was understood that the Minister of Justice would introduce a general telephone bill incorporating the requests of this Union of Canadian Municipalities; and, whereas, at this session a bill was passed, to-wit, the Canadian Telegraph and Telephone Bill, which in one important feature made it optional instead of compulsory for any telephone company of Canada to transmit over its trunk lines messages of any rival telephone company; be it resolved, that we regret such action, and would pray that the act be so amended as to make it compulsory for any telephone company doing business in Canada to transmit such messages at regulated rates, which we know would be in the interests of the people of Canada."

There are many other features which could be embodied in the resolution, namely, the establishment of municipal telephone systems, such as Port Arthur and Fort William have established, and also the power of expropriating properties belonging to the Bell Telephone Company in certain sections, as well as that of other telephone companies that may be in use. I simply bring this motion forward to open the discussion and get the opinions of the members upon the subject.

Mayor Urquhart.—As I understand, the resolution refers only to a special act passed this session. I think we might all agree with the terms of that resolution, but it seems to me there is a very much wider question arising out of the whole telephone situation, which should be dealt with at some time by this convention before it adjourns, and I want to know whether this is the time when we should take up the whole telephone question.

Mr. Lighthall.—That is the understanding of the committee.

Mayor Maxwell.—I second the motion, Mr. Chairman.

Mr. Dyke (Fort William).—Mr. Chairman, there are few places in the Dominion of Canada that have taken a more advanced step with respect to municipal ownership than the twin towns of Fort William and Port Arthur, situated at the head of lake navigation. If you will pardon me, I would like to take a few minutes of your time in explaining the situation. The town of Fort William in 1897 appointed a citizens' committee to consider the feasability of installing an electric light and water works system. This committee reported favorably, and within six months of the passing of the by-law the electric light and waterworks systems were installed. The town grew rapidly, and in a year the electric light plant had to be increased by an expenditure of $20,000; and, although that was only three years ago, we have this year to increase our electric plant by an expenditure of $40,000. We have found both the water and light systems good paying systems from the beginning, and our citizens are proud of the low rates they get and the splendid service they have.

Now, sir, in relation to the telephone matter, which is the subject under discussion, the Bell Telephone Company has operated in Fort William and Port Arthur some ten or twelve years. Its service during the last seven or eight years was scarcely worth the name of a service. Private individuals and also the councils of both towns appealed in vain for improvement in the service, and about a year ago the two towns appointed a joint committee to consider the advisability of installing a telephone system, in which the rates for the two towns were to be the same, and the class of telephone was to be alike, and, excepting that each town owned and operated its own section, it was to be a joint system, as far as free exchange, quality and rates and other matters were concerned. We installed this system about December last, and our people are very much pleased. Unfortunately Fort William had a serious fire in March last, and the telephones were established in a very combustible building, and it destroyed the central exchange. We were out of business for sixty days, but we erected a fireproof building, installed a new central equipment, and got into operation again all within sixty days. The Bell Telephone Company never had more than 115 telephones in each town. Although municipal ownership in telephones has been in existence scarcely more than a year, and Fort William was out of business and seriously handicapped for two months, Port Arthur has 325 telephones and Fort William has 300. The tariff which we charge is $12.00 a year for residences and $24.00 a year for business purposes. We expect at the end of this year a revenue in each town of $5,000. About $4,000 will operate the plant successfully and carry all its indebtedness, and will leave us about $1,000 a year for expansion. We consider this a very good showing, and it is very encouraging. There is, however, another side to this question, as we see it, which is exceedingly discouraging. We find the Bell Telephone Company trying to hinder us in every way it can. For instance, it distributes free telephones, and even makes a canvas of our citizens, telling them that if they will accept the Bell telephone it will not cost them anything for a year. You can understand how hurtful that is, because, while the very great majority of our people are loyal, you will find here and there a man who thinks he is being complimented if he is offered something for nothing; but I am glad to say we have only a very few of that class of citizens—perhaps fifteen or twenty. Now, it seems to me that this free telephone business is a matter that ought to be capable of being suppressed by law.

Another matter in which the Bell company is capable of giving us considerable trouble is in misrepresentation. Doubtless some of the gentlemen here have seen from time to time, in the great newspapers of our country, little paragraphs setting forth the statement that municipal ownership in Fort William is a failure, and especially so in relation to the telephone system, and this statement has been published widespread to the great annoyance of our systems.

Mr. Lighthall.—And paid for.

Mayor Dyke.—Yes, and paid for. I wrote a letter to the editor of the Toronto *Globe*, and I have a copy of his reply here before me, in which I referred to this statement. He wrote me in reply a letter saying that the matter about which I complained was a paid advertisement. Now, gentlemen, when a great monopoly like the Bell Telephone Company will resort to such tactics, and will pay as an advertisement for statements that tend to put a municipality in disrepute as to its finances and management of municipal systems, you can see to what length it is prepared to go in order to maintain a very unjust monopoly.

In addition to this, it interferes with our legislative matters. I found, in looking over the matter, that there was one little weakness in the agreement between the two towns. There was nothing stated as to each town being obliged to keep its system in good repair, and that they should not have the privilege of selling without the consent of the other town, and so we got a bill before the legislature, stating that neither town should have the liberty of selling or leasing its system without the consent of the majority of electors entitled to vote on that question in both towns. Now, would you believe it? The Bell Telephone Company had one of the largest lobbies against that little bit of legislation in the provincial legislature last spring that could possibly be got up, and it was only by just a little foresight that the matter was got through at all. I happened to get the matter through the bills committee stage and into the house before the Bell company was aware of the fact, and then it could not be withdrawn. I go into this matter only to show that, in connection with our telephone system, we have a real fight on every side with the Bell Telephone Company, and we must be prepared to sustain ourselves for having put ourselves in this position. We will not go back now on matters which pertain to our civic rights as citizens. The Bell Telephone Company keep a large staff of officials and men in our town regularly. It has them there now and for nine months since we installed our own system, they remain there doing everything they can in the way of misrepresentation and speaking disparagingly of everything the town does in connection with its telephones.

Now, I want to say this. We want to have the complete control of our own streets, and I am sure that is a matter which appeals to every municipality in our entire Dominion, and whatever legislation or expense is necessary we should be willing to put it up, in order that the municipalities shall have complete control of their streets. (Hear, hear.)

Another thing is that we want admission to the railway stations. I want to express here the very great pleasure of the Council of Port Arthur and Fort William that there should have gone to the Dominion house the amendment to the Railway Act this year, and we hope that amendment will pass safely through the senate, so that it will become law. Here is an anomalous position for towns to be in. Fort William is practically a railway town, but to-day the municipality of Fort William and Port Arthur cannot have their telephones placed in the railway stations and freight offices of the Canadian Pacific Railway, neither in Port Arthur or Fort William. I am very glad to say that the Canadian Northern has permitted our telephones to be placed in its offices, but the Canadian Pacific Railway says it has an agreement with the Bell Telephone Company which shuts out all other telephones from the system. Now, the amendment to the Railway Act which went through the House of Commons was to the effect that where a municipality has its own telephone system and applies to a railway company for admission, and is refused admission, it should then apply to the Railway Committee of Parliament, which has power to order the telephone admission into the railway offices. We hope that some steps will be taken here to-day, or during this session of the union, that will see that the Bell Telephone Company is not permitted to kill that amendment in the senate. It is the very life of our existence, as far as our telephones are concerned. Many of our merchants have to send a special messenger, or go down on their wheels, or drive to the freight sheds or railway station, and they do this rather than use the Bell telephone, because this amendment to the Railway Act is in progress, and we are hoping that it will become law, and as soon as it is law we will apply to the railway company, and if it does not admit our telephones, we will be down here five hundred strong, if necessary, to see that the Railway Committee orders our telephones into the railway offices, so that we may not be under that disability. (Hear, hear.) I hope, therefore, that this session of the union will take the matter up, and see that some arrangement will be made to stiffen the backs of the senators, so that they will not weaken on this matter, but put it through.

Then there is another matter that is looming up before us, and that is the right to connect our system with the long-distance system. Thus far there has been no long-distance telephone at Port Arthur and Fort William, but the Bell Telephone Company, scenting the danger that is ahead of it by the action of these two towns, has under construction a long-distance service. It has gone out westward towards Winnipeg about twenty-five miles. Now, what we want is the right to use that long-distance telephone service at a fair tariff, and that the Bell Telephone Company cannot say "We won't take your messages." We must have that right at a fair tariff. I think also that this subject appeals to every municipality.

There are a number of other things I would like to speak of. I think it would be a good thing (although it scarcely applies to us, as we have gone to the expense of installing our own system) that municipalities should have the right to expropriate the Bell Telephone Company wherever operating if the municipality wants to put in its own system. I think before we separate we should take some steps to see that every municipality in the Dominion is appealed to to join the union, in order to make us that much stronger. I know I would not object to spending three or four weeks around my own district, say, from one hundred to three or four hundred miles, in order to lay before the different municipalities the advantages of joining the union, because I am sure we would only have to ask for any fair thing of either the Provincial or Dominion Parliaments and we should get it because of the power behind us, for after all what takes with Parliament is the number of votes you can command.

I would therefore strongly urge that the members discuss at length these disabilities I have outlined. We own our own street railways in both towns; we own our electric light and water works systems and our telephone service, and we are bound to remove any disabilities from them, so that these great utilities of life can be furnished in as cheap and efficient a manner as possible to the public in the towns in which we live. (Applause.)

Mr. Lighthall.—In the meantime, gentlemen, the mover and seconder have altered the motion a little to make it more general by adding the following clause: "That the Dominion Government be urged to bring in a General Telephone Bill, which will fully protect municipal rights, and that the Executive be empowered to press this resolution to a conclusion."

The Acting Chairman.—I presume, gentlemen, that discussion on the subject is now in order.

Mayor Urquhart.—Mr. Chairman, gentlemen, the city of Toronto, a little over a year ago, undertook to contest the right which had been assumed by the Bell Telephone Company to enter upon the streets without the consent of the municipality. The Bell Telephone Company was incorporated by Dominion Act passed in 1880, by which, in so far as certain poles were concerned—forty feet and under—it claimed to be entitled to enter upon the streets of any municipality, and put up poles and string wires without the con-

sent of the municipality. Two years later it appeared to have some doubt regarding the constitutionality of the act and the powers conferred upon it, and applied to the Legislature of the Province of Ontario for an act confirming the act passed by the Dominion Parliament. The act was so confirmed, with certain amendments. After a careful perusal of those two acts, the conclusion was arrived at in Toronto that the contentions of the company were not correct; that under the Ontario Act, which our counsel advised us to be in force, the Bell company had no right whatever to enter upon the streets of any municipality without the consent of the municipality being first obtained. We entered an action to support this conention, and the matter was heard before Mr. Justice Street, one of our strongest judges on the Ontario bench, and he decided in favor of the city of Toronto holding, briefly, that the Ontario Act was in force, and that notwithstanding the Dominion Act, the Ontario Act governed, and that it was the clear intention of the Ontario Act to forbid the Bell Telephone Company carrying any poles or wires along any street without the consent of the municipality. The Bell Telephone Company appealed from that decision to the Court of Appeals, and the matter was argued nearly a year ago. The Court of Appeals reserved decision. Only last Monday the court's decision was announced, and the effect of this judgment is to reverse the judgment of Mr. Justice Street, and to hold that the Dominion Act is in force, and that, so far as poles and wires are concerned, the Bell Telephone Company has, under the Dominion Act, absolute right to enter upon the streets of any municipality in the Dominion of Canada. The judgment of the court, however, is not unanimous, Mr. Justice Moss and Mr. Justice Osler holding that the Dominion Act is in force, that the Bell company's application to the Ontario Legislature for a confirmatory act did not affect the powers conferred upon it by the Dominion Act, and hold that by section 92, subdivision 10, of the British North America Act, the Dominion Parliament had the right to incorporate and to confer these powers upon the Bell Telephone Company. Mr. Justice Garrow practically adopts those judgments, but he does it with a limitation. The effect of his judgment is that he is of opinion that the Bell Telephone Company has the right to enter upon any street, but that the city has the right to say what street it shall put its poles on and string wires upon; that is, the city may perhaps control the right of location, but the city shall not unreasonably oppose the location of the line which the Bell company requests. Mr. Justice MacLaren dissents from his colleagues, and practically upholds the judgment of Mr. Justice Street, perhaps with a slight limitation. He holds that the Dominion Parliament had the right to pass the act it did, but that the Bell company, having come to the Ontario Government seeking a confirmatory act is bound by the terms of the act as passed by the Ontario Legislature, and that under the terms of this act it has no right to put up poles or string wires along any street without the consent of the municipality first had and obtained. He practically coincides with Mr. Justice Street.

As the litigation now stands, we have Chief Justice Moss and Mr. Justice Osler against municipal rights; we have Mr. Justice Street and Mr. Justice Maclennan in favor of the municipalities, and we have Mr. Justice Garrow partly one way and partly the other way. I have no doubt that the city of Toronto will carry this case to the Privy Council for the purpose of having a final determination. (Applause.)

I was delighted this morning to hear the remarks of the mayor of Fort William, and I think the towns of Fort William and Port Arthur are to be congratulated, not only by this union, but by all the municipalities of Ontario, for the magnificent stand they have taken in supporting and maintaining their rights, and also for the magnificent example they have given to the other municipalities of the municipal ownership of those public franchises. (Applause.) I think the sooner the various municipalities in the Dominion of Canada come to the conclusion that the only proper solution of these difficulties with the companies controlling public utilities upon the streets of any city, town or township is that the municipalities themselves should control it—(hear, hear)—the sooner we will put an end to all these difficulties.

The methods and perhaps the argument of the Bell Telephone Company are peculiar. A great many complaints were made recently regarding the very poor service that has been given us in the city of Toronto. The replies given were to the effect that the poor service was not the fault of the company, but the fault of the city. The company said that the inadequate service was the fault of the city, because the city had prevented the company from putting in proper equipment and erecting a proper building. The reason given for that was that the city of Toronto had opposed the getting an increased issue of capital stock, which would have enabled the company to put up the buildings required. The facts of the matter were that the Bell company came to the Dominion Government here with a proposal to increase rates, not only in the city of Toronto, but in the city of Montreal, and I think that with that proposal it had also a request to increase the capital stock of the company. We came down here and opposed the increase of rates, and we were able to prevent the increase of rates, and the other bill did not go through that year, and now the company seeks to blame the city of Toronto on account of the poor service which we are having.

I think notice should be taken by this convention of what occurred in the eastern part of the county of York, and the western and southern part of Ontario, last spring and winter, when to some extent the same question came up which Mr. Dyke raised here to-day regarding entrance into the railway station of the Canadian Pacific Railway Company. I suppose you are all aware that an appeal was made in that case to the Criminal Court to construe the arrangement which had been entered into between the Bell company and the Canadian Pacific Company, which gave the Bell company a monopoly of telephones in the stations of the Canadian Pacific Railway, and it was held by the judge of the county court of the county of York that the matter was not one which came within the jurisdiction of the criminal code. I think we ought to endeavor in every way we can to support these municipalities in fighting for this right. This was the case of a local telephone line of twenty-five subscribers, all of them farmers, I believe, who sought, for their own business interest, to have connection with the Canadian Pacific Railway station in their neighborhood. This was refused, and the line they had erected at their own expense, and for their own convenience, was to some extent rendered useless, or, at all events, it was not of the same importance to them as if they had that railway connection which they should have had if the rights of the municipalities and the rights of other companies were properly protected under the Bell Telephone Act or by general legislation.

I think the last point taken by Mayor Dyke is a very important one—the question of expropriation of the Bell Telephone Company's plants in the various municipalities in the event of the municipalities desiring to expropriate them. It strikes me the true solution of the telephone matter is the one mentioned in the report of the secretary, that the Government should own the long-distance lines, and that local municipalities should own or control the local exchanges. If we had the Dominion Government owning all long-distance lines, then the difficulty suggested by Mayor Dyke's experience at Port Arthur and Fort William could not have any place at all. Then, if the local lines were owned or controlled by the local municipal authorities, or by a local company controlled by the municipal authorities, we could ourselves see that we received adequate and proper service.

These questions are becoming more important every day, and I think the sooner the municipalities unite upon a

policy in regard to this question, as well as upon some other questions that will come before the union, the sooner we will obtain those rights to which, as representing the municipalities, we believe we are entitled. (Applause.)

Ald. Barclay (Winnipeg).—I would just like to add a few words to what has been said on the iniquitous way in which the Bell Telephone Company has used the people throughout the length and breadth of the country. We have had it very forcibly put upon us in the west, and while I admired the towns of Port Arthur and Fort William for their endeavors and their success, I think that this union should also express its appreciation of a small place a little farther west, which was the first to enter opposition against the Bell Telephone Company in the west. I refer to the town of Neepawa, which has had its telephone system for the last four years, which public ownership, I learn, has been the cause of the people there taking thorough advantage of it. I support most strongly the remarks of Mayor Dyke, and also those of Mayor Urquhart, that this convention should make the telephone matter the first matter for hot and hard pressure in the government and out of government. With regard to long-distance telephones, I am not so very much concerned with regard to the long-distance telephone system falling into the hands of the government as I am interested in the short-distance telephone falling into the hands of the people of the different municipalities. Surely, if the different municipalities would do like Port Arthur and Fort William and Neepawa, and come down with a strong foot upon the Bell Telephone Company, as they have done, the Bell Telephone Company would want to stay in the race, and would have to give every opportunity for the short-distance telephone as well as the long-distance one. Another thing is, if we had the whole of the short-distance system under municipal control, the government would be bound to put in a long-distance telephone. I am only too glad to hear that this telephone matter has been brought so strongly and so clearly, on account of the fact that Winnipeg at present has a sub-committee appointed for the purpose of carrying out, as soon as possible, the sole control of its own telephone business. I may say they have gone so far as to have offers from different companies for putting in the system, and we can easily read between the lines of the offers that we can put in a system at half the rates charged by the Bell company, and have a surplus left for extension. (Applause.) That being the case, we, as a union, should leave nothing undone towards obtaining municipal control of the telephone system. In Winnipeg we would have more trouble in municipal control of telephones, because Winnipeg is the greatest place in the whole continent of America for using the telephone system. At present they have no fewer than two thousand five hundred telephones for a population put down at 42,300, but which is now, I am sure, close upon 70,000, and, if the rates were apropos, the number of telephones would be three times that. I strongly urge upon the union the necessity of giving a system to whatever municipality is desirous of becoming owner of the telephone system, and I expect that Winnipeg, in a short time, will apply to the union for your best efforts to help them through with a scheme which they have at present in hand with respect to either installing their own system or expropriating that of the Bell Telephone Company.

Ald. Ross (Ottawa).—I suggest that we add the following clause to the resolution: "That this union urges upon the Dominion Government the special desirability of legislation to enable any municipality to expropriate any local telephone system within its limits." If we have that power, no telephone abuse is possible. Without that power we have no check upon the telephone service. We may make arrangements with any company for telephone service; we may arrange about prices, and when the contract is made and the price is established we have no power, and I doubt whether, in such a practical manner, you can get power to enforce a good system. The prices may remain the same, but the service deteriorate. I think we ought to be able to say to the Bell Telephone Company, or any company for that matter: "If your service, or your prices, are not satisfactory, we will buy you out at a fair price."

Now, sir, in the course of discussion during the past session of Parliament of this telephone matter, deputations from several cities waited upon the Minister of Justice, and at that meeting the representatives of several large municipalities pointed out the desirability of the municipalities having power to expropriate the Bell telephone system within their borders. There was no particular answer given to that request then, but subsequently the argument has been used with some of us who were members of the deputation on that occasion, that it would not be a fair thing to mutilate the Bell Telephone Company. The argument used was, "Why should you cut off the arm or leg of the Bell Telephone Company and leave the rest? Do you consider that fair?" and at the time that argument seemed a pretty forcible argument; but I have heard the statement since made in Parliament, and not denied, that the long-distance lines of the Bell Telephone Company are the most profitable lines it has. If that is the case, we are doing it no injustice in expropriating local systems at a fair price. In Ontario our law gives us the right to expropriate, for instance, electric power plants within our borders. That is recognized as fair—also to expropriate water works. There is therefore no reason that we should not expropriate this other great public utility. I think that is a power that ought to be agitated for, and therefore I would like to see this union pass this resolution enabling municipalities to expropriate the Bell telephone system.

Mayor Maxwell (St. Thomas).—I will second Mr. Ross' amendment.

Alderman Mundy (Galt).—It appears to me that the resolution, as first offered, covers all we expect to reach at this time. The Bell telephone system, through its long system of connections, has got to be a national undertaking, in which every local system is a part, and it would be simply impossible to have municipalities here and there all over that vast system expropriating a link of the chain, and making use of it in its own way without due consideration to the interests of the whole, and I agree at once with the idea of Mayor Urquhart, of Toronto, that before anything can be done in this matter that will be of practical value to the municipality, it will be necessary to settle the whole question from beginning to end. It is impossible to undertake it otherwise. You are not sure that the municipalities are a unit in expropriating their various systems within their municipal limits. One might and another might not. I believe the long distance telephone is a matter of great importance to the country, and at this present moment, according to my view of the question, I fail to see how it is possible to have the long-distance system operated in a local municipality along with local interests—how the rates will be managed, and other difficulties overcome. I think the mayor of Toronto has laid down the proper principle, that there should be some grand central idea to radiate around rather than taking it up piece-meal, and each municipality acting on its own account, under conditions entirely dissimilar. We must be practical in what we demand. There must be nothing that will appear absurd when we reach the point of asking for legislation, because this is a serious matter. It is most unfortunate that the enterprising people of Fort William and Port Arthur had so much difficulty, and it does seem to me that surely, in this free Canada of ours, there is a law that will protect any community against a slander published in the press of the province, even if they were paid for it; but it would seem to me that we can scarcely redress a grievance of that kind in a meeting of this character. I am not sure we are going along the right lines in urging the expropriation idea. I am afraid we are in a

field where we would be very liable to be turned down as being impracticable. I would rather go just a trifle slower, and clear the work as we go along, and, if possible, in some emphatic way, draw the attention of the government to the idea of government ownership of that which is national or provincial in its character, and leave the control and operation of the local systems and the profits therefrom in the hands of local companies.

Mayor Urquhart.—Mr. Chairman, the gentleman who has just spoken must have misunderstood me. I am quite in accord with Alderman Ross' resolution in favor of expropriation. What I said was, that I thought the true solution was local ownership of local exchanges and government ownership of the long-distance lines, and, to urge that plan, we must have the power that Alderman Ross has just cited —we must have the power of expropriation.

Alderman Mundy.—Yes, but they must go together. You certainly could not expropriate local plants, and not have control over long-distance plants at the same time.

Mayor Urquhart.—But if we had the right of expropriation, we could soon obtain rights over the long-distance lines.

Mayor Floyd (Cobourg).—There is a matter I would like to mention in connection with this resolution; that is, I think something might be done to assess telephone plants in towns. There is one asset of the company which we cannot touch in making our assesment, and that is the telephone itself. There are a hundred and fifty or two hundred telephones in our town, but we cannot assess the telephones, and I would like a clause put in the resolution, that, if you are going to appeal to Parliament to have any change made to cover that point, that telephones could be assessed as well as any other plant.

Mr. Lighthall.—Mr. Chairman and gentlemen, as having had a good deal to do with the telephone legislation during the last session, I would like to make a remark or two on one or two of the points brought forward. One is that expropriation is not one of those things on which all the parties interested in that legislation could agree. It might be possibly brought forward in some form which all the municipalities concerned could agree upon, but I think it would be wise to leave that to some future period, at least in the hands of the general executive. The executive, I think we can say, acted in a conservative and, at the same time, in a progressive manner. We seemed after all to receive the support of the different contending parties on this question, and the motion itself, to leave the matter in our hands, would be the best form in which it could be placed for action. It allows us to move flexibly, and according to circumstances, to obtain the very best we can for the municipalities. If we introduce individual plans, we run some risk of difference of opinion and running against obstacles; but if we are asked to do the very best we can to obtain all we can in favor of municipal control and right, I think it is the best form of resolution under the circumstances, as the telephone situation now exists.

Alderman Lebeuf (Montreal).—I am sorry to say that I am not of the same opinion as our friend Mr. Ross, of Ottawa. I think it would be going a little too far to ask to expropriate the Bell Telephone Company. I would suggest that we try to get from the government the means of remedying the difficulties and the power to say, "You are charging too much; we will examine your books; we will examine what it is costing you to operate your system, and what it cost you to keep it in repair, and we know you are making so much profit, and that it is too much, and we don't want you to charge more than such an amount. And, moreover, you have been injuring such and such a city, and we want it stopped." Let the Government have its hand upon the telephone companies the same as it has its hand upon the railways. There is no doubt that the railway companies at times injure private and public property, but we do not think of expropriating the railway company simply because of possible injuries that may be caused to certain municipalities.

Mayor Roger (Peterboro).—The subject we have before us is probably as important as any this congress will have to deal with. Quite a variety of opinions have been expressed, and several amendments to the resolution have been suggested. If it is in order, I would move, by way of amendment, that, before voting on this matter, the original motion and amendments be referred to the Committee on Resolutions for consideration.

Mayor Urquhart.—I second Mayor Roger's motion.

Mayor Cook.—It makes no difference who the owners of the exchange may be so long as there is an understanding that the business shall be interchanged. No one suffers. I presume arbitrators would be appointed, and the Bell Telephone Company, or any other company for that matter, would receive full and adequate compensation for the business taken over from them.

Any member of this convention who has studied the Independent movement in the United States—and the Independent movement is far ahead of the monopoly in the way of business to-day—will realize that by this interchange of business on the part of these several companies considerable advantage will accrue, and we all know the gigantic success that has been made by these Independent companies on the other side of the line. If we cannot get from the Parliament of Canada the right to expropriate the local system—if we are going to make a success of the telephone business—if we cannot get the powers of expropriation from the government, then I for one am in favor of the open door, so far as competition is concerned, in order to get ahead of the monopoly from which we have had to suffer for years.

I want to say that I am satisfied that every municipality in Canada will sympathize with the city of Toronto in the judgment which was given the other day. We in Ottawa are almost in precisely the same position as the city of Toronto. We allowed our agreement with the Bell Telephone Company to lapse six months ago. The Toronto agreement lapsed six or seven years ago. As yet we have not renewed it, and do not intend to renew it until we can get something far better in the way of rates than we have had. If the city of Toronto proceeds with its appeal, which I sincerely trust it will, to the highest court in the land, I hope and I think we all hope for the vindication of municipal rights that Toronto will be successful in the end.

Alderman Ross.—I will withdraw my amendment in order to let the main motion go through, but, as I think it is important we should have a pronouncement by this meeting upon this principle of expropriation by municipalities, I will move a main motion on that subject.

Dr. Ochs.—We find opposition to the expropriation idea arising only from the Montreal delegates. Now, I understand that they have two telephone companies operating there—the Merchants' and the Bell companies. They have never had difficulties, and the oppression of a monopoly such as we have, where we have just the Bell company to deal with. They hardly know the extremes to which that company will go when it has a monopoly.

Mr. Lighthall.—I think we might all consent to boil the motion down to the last clause, and pass it by way of compromise, namely, "That the Dominion Government be urged to bring in a general telephone bill which will fully protect municipal rights, and that the Executive be empowered to press for this conclusion." We need not mention the expropriation idea. Carried unanimously.

Alderman Ross.—I now move, seconded by Aledrman Campbell, of Halifax, as follows: "That in the opinion of this union the Dominion Government should provide legislation to enable any municipality to expropriate any local telephone system, the government to retain control of regulations and rates for interchanges of service between local systems and long-distance lines."

If the government passes any such legislation it would be optional entirely on the municipalities to take advantage of it. This power is a power designed first of all to enable municipalities to make fair bargains, and if fair bargains cannot be made, then to enable them to buy out the Bell company at a fair price. Alderman Lebeuf knows perfectly well what kind of prices are given in the case of municipalities and companies. They are always very liberal. So that when we propose to take possession of the Bell property, we propose to pay a high price for it. Alderman Lebeuf has mentioned the hardship of killing or buying it out, but he does that every day with respect to private land owners who are expropriated. Why are they expropriated? For the public good. Private interests must be subordinated to the public good. (Hear, hear.) If the Bell company were simply a local system, nobody would dream of expropriating it. Now, the question arises what is the difference between the Bell company and other interests. The difference is that the Bell company's ramifications extend throughout the whole country, but if its long-distance lines are the best paying property it has, you don't hurt that property. This motion of mine is simply to give any municipality the option of buying out the company. There is another consideration, and that is, that the company is going to lose if we do not get such a power of this kind. We have a mandate from the citizens to establish a municipal service. If we were to put a by-law before the electors next January, to spend three hundred thousand dollars they might vote it, and then what would happen? We would have to set to work to establish a rival system and sooner or later the Bell company would be the losers. What we want to do now is to be able to expropriate the company and give it full value for its system. Certainly the country will not stand the Bell monopoly forever, and there is sure to be trouble.

The motion was then referred to the committee on resolutions, and the meeting adjourned.

Concerning Wireless Telegraph Transmitters

LEE DEFOREST, Ph. D.

Throughout the various attempts which have been made to approximate in wireless telegraphy, even remotely, something of the accuracy in resonance effects, so well known in acoustics, sufficient attention has not been shown to the necessity for generating at the transmitter a long train of but slightly damped oscillations. All refinements and closeness of tuning at the receiving station are futile if the transmitter radiates but three or four impulses at each condenser discharge. Failure here has been largely due to imperfect arrangement and construction of condensers, spark-gap, faulty insulation, etc., in the transmitter, a condition inevitable at the start of a new art, when apparatus at hand is entirely such as the physics laboratory can supply, and when a host of minor details and refinements are neglected—conditions which alone distinguish between the experimental laboratory work and actual engineering achievement.

The rapid damping of the transmitter oscillations are due chiefly to two causes: First, that from losses due to radiation from the antenna (which are considered useful and necessary); and, second, to losses resulting from leakage, heat and dielectric hysteresis, which are certainly detrimental to an extent little appreciated. Of leakage from the antenna there will always be a certain amount. Thorough insulation, especially at top of the mast and from all guy ropes, cannot be too strongly emphasized. If the antenna is connected to the resonator, or feeding circuit, inductively, whether by transformer or auto-transformer linking, the static potentials excited therein are slight compared to what result from the old method of attaching antenna and earth wires directly to opposite sides of the spark gap. By the newer method, therefore, the problem of adequate insulation at the base of the antenna, where this enters the station house, is greatly simplified, for one may place his hand directly upon the bare antenna wire without shock or injury. At the top of the antenna, however, we have by the inductive connection with the resonator circuit greatly amplified potentials, due to the fact that by such arrangement the oscillating character of the disturbance set up in the antenna causes a marked potential loop at the upper or open end of this oscillating wire; and by successive reflections of the current there, without change of sign, potentials several times those found anywhere in the closed oscillating circuit exist. As a result the insulation at top must be especially thorough. A petticoat insulator, giving large and dry surface insulation, ought to intervene between antenna and its support. The layman is astonished at the facility with which these high-frequency, high-potential currents leak away, over surfaces carrying the slightest dust or moisture, or through the veins even of dry wood. Stone, even in dry weather, behaves like so much metal. Ebonite or glazed porcelain or glass are the best insulants here, and surface insulation is the controlling factor.

Mechanical reasons render it advisable to use steel guys for the past, but if these be completely insulated from the antenna the leakage to them through damp air, and, indirectly, by currents induced in them, render it necessary to cut these guys into several short lengths, connected together by strain insulators (ropes with dead eyes or porcelains), and to most carefully insulate from earth at the bottom. In damp weather rope, especially if untarred, is but little better than wire.

If the air is moist or a heavy fog prevails the invisible brush leakage from the antenna into this semi-conducting medium gives the effect of a large fictitious capacity between antenna and earth, greatly increasing its natural period of oscillation and requiring readjustment of the constants of the closed resonator circuit, if it is intended to keep this and the antenna circuits in syntony. But worse than this is the fact that this apparent additional capacity is largely fictitious, and, as a leakage, represents a large hysteresis loss, not recoverable, but producing additional damping to the oscillation. The same phenomenon exists, often to a greater degree, in the condensers themselves. In any Leyden jars or glass plate condensers in air vivid brushes are observed extending for an inch or more at the edges of the tinfoil. At these portions of the glass, especially if this latter contain any lead, a surprising amount of heat is generated, showing clearly that considerable losses of energy there exist, and unless the glass is the best of flint a further loss in dielectric hysteresis exists.

The glass condenser in air is generally preferred by experimenters for the very reason that these brush leakages, while they also cause an additional capacity over what ordinary static measurements will show, act as buffers for the impulsive high-potential charging of the condenser and save the dielectric from puncture. It is well known that a Leyden jar filled with oil is far more liable to break down, and especially so if the outer coating also be covered with oil or paraffin. When the condenser is placed in an oscillating discharge circuit, containing inductance, the potentials devel-

oped at the edges of the tinfoil are often several times that of the charging current (due to heating up and reflection of the charges there from resonance effects), and this effect becomes greatly exaggerated with the oil condenser. But it is just this resonance which is a *sine qua non* in syntonic working, and it is wrong to allow brush leakage, with the great damping resulting, to save the dielectric. The correct practice calls for a suppression of all brush losses at every cost, and to employ oil or condensers otherwise sealed and sufficiently bulky to give requisite safety with capacity.

Another bad element is the chain usually employed in the Leyden jar. After a little usage this becomes badly eaten up, and frequent small sparks are observed between its links and where it contacts with the tinfoil; I have sometimes known the chain to be actually burned in two. So aggravated do these faults of the Leyden jar become with much usage that it is impossible to measure the period of oscillation of a circuit employing as condenser a battery of old jars. The foil frequently starts away from the glass, allowing all the losses and trouble from a gas dielectric. All in all, the time-honored Leyden jar, one of our dearest heirlooms from early physicists, is the element employed in wireless telegraphy which is least suited to its task. Yet it is well-nigh universally advocated on account of its strength, convenience and cheapness when applied to small installations.

The amount of inductance existing in a battery of Leyden jars, when these are connected up as closely as possible is surprising and little recognized. In fact, I may say that a condenser discharging periodically from lack of inductance in its discharge circuit does not exist. For high frequencies the inductance in the sheets of foil themselves is sufficient, and the spark gap and leads thereto supply the rest. In a battery of, say, ten Leyden jars connected in parallel I have found that the exact method of connection is of the utmost importance. For example, if the ten be connected in one row, the spark is not so violent, large or of so cracking a sound as when the jars are bunched. The best arrangement is in a circle, with leads from all of the jars of exactly the same length. Otherwise we get a tendency for a series of discharges from the several jars in turn, and not from the batteries as a unit. Under certain conditions this little detail of grouping and connecting the jars has made all the difference in transmission of or failure to transmit signals. It is these little details of exact disposition of connections, etc., which are so apt to be overlooked by those familiar only with ordinary electric currents that have so grave an influence in wireless telegraphy, especially where syntony is attempted. The high-potential leads to the transformer or induction coil may sometimes have an influence on the oscillating circuit to which they are attached. To minimize the effect choking coils, preferably of a spiral form, should be inserted in such leads close to the points of connection.

The heating of the spark gap terminals, especially where alternating currents are employed for charging the condenser, is a simple proof of the losses existent in the spark. The wider the gap the greater the loss is through heating the column of air. A simple method of reducing this gap, while maintaining the requisite high potentials, is to employ a series of small gaps between balls or disks of small curvature. When large power is employed (exceeding 3 kw.) it is well to provide special means for radiating the heat and constantly renewing the supply of cool unionized dielectric. There is nothing in a liquid dielectric, but considerable is to be said in favor of the spark in air under pressure, as reducing sparking distances and allowing an especially sudden, disruptive breakdown—a spark of high conductivity and slight damping.

With a 1 kw. transmitter it is easily possible to obtain a reading in a hot-wire ammeter, inserted in the antenna, of over two amperes, and five to ten times as much in the closed oscillating circuit itself. This, with 20,000 volts applied at the condenser jars, gives roughly a calculation of about 70 kw. This anomaly is, of course, explained by Hertz's calculations of the amount of energy radiated from his small dumb-bell oscillator. During a brief hundredth-thousandth of a second the energy put into the circuit at a 1 kw. rate is radiated at a rate enormously greater. The exact quantitative relations here are difficult of measurement; they involve the exact potentials of resonance, the damping and duration of the wave-train, the power-factor, time-coefficient of expansion of the hot-wire, etc. But the test is a clear and convincing demonstration of the enormous quantities of energy which a small transmitter is radiating and of the amount which the generator would be called on to supply could the much-desired undamped wave-train be obtained. It is evident that a direct current source of high potential and relatively large output, with high-frequency oscillating circuit supplied as in the case of the Duddell singing arc offers a solution.

In view of the above considerations it is not difficult to point ou tthe fallacy in certain calculations which are often given to show the sensitiveness of a coherer or other wave detector, which is influenced at 100 miles by one-half horse power or less at the transmitter. Their sensitiveness is indeed remarkable, but if what such misleading figures seem at first sight to indicate would be little less than infinite.—*London Electrician.*

THE LAST WORD.

There is a man who has broken the record in the matter of having the last word with a woman. And he did it in such a neat way, too, that the woman's sense of the ludicrous made her forgive past injuries and averted from his head a serious penalty.

A few days ago he was trying to get a certain telephone before 10 o'clock and the party was slow in answering. The man chafed and fretted and fumed and finally began to speak sharply to the telephone girl, who kept telling him that the party would not answer. When he grew too impatient and too emphatic in his language the girl said very crossly:

"Well, I'm trying to get them for you."

"Well, don't get hot; keep on your shirt," was his angry reply.

The girl immediately called the chief operator on the line and told her what the man had said and left the chief to deal with him.

"You have been very rude to the operator," said the chief. "Such language is not permitted over the wires at any time. You will apologize to the girl right now or I will order your telephone taken out this minute."

"All right," said the man, seeing no other way out of it "Put her on the line and I'll apologize."

The chief operator called the operator in on the line again, and left her to receive the apology. It came thus:

"Are you the girl I told to keep her shirt on?"

"Yes, I'm the one."

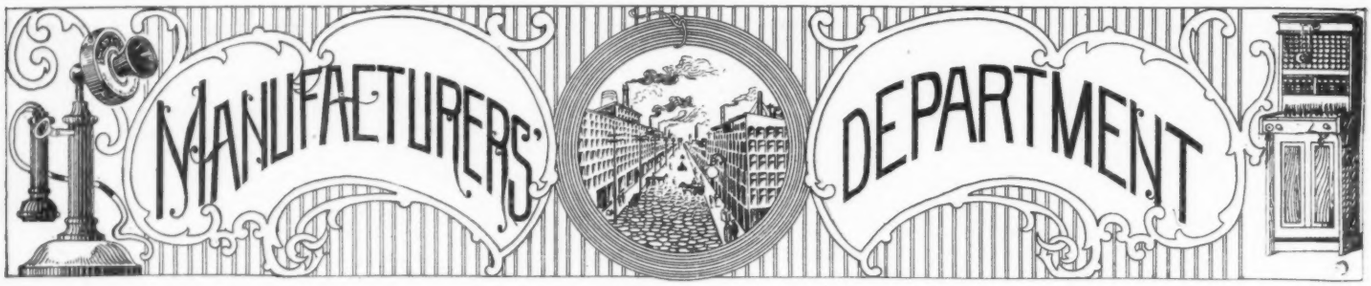
"Well, I'm sorry. You may take it off now."

And he hung up the receiver so quickly that there was no chance for a reply, even if the dazed young lady had been able to frame one inside of three minutes.

First she was angry, then she began to laugh and by the time the chief cut in again and asked if the man had apologized she was ready to say, "Yes, everything is satisfactory now."

The man will not lose his telephone and he has learned his little lesson, which is all the girl wanted anyway.

Telegraph offices have been opened at Booysen's Rail and at Jupiter Rail, in the Transvaal, for the transaction of public telegraph business. An office, to be worked by telephone, has also been opened at Blinkwater, in Rhodesia, for telegrams in plain English only. The name of the telegraph office at Gwanda Junction, in Rhodesia, has been changed



A MODERN EXPRESS SWITCHBOARD.

Though the general principle of a mechanical self-restoring drop has been in use in a number of foreign countries, as well as in the United States, for about ten years or more, and many forms and different styles have been evolved during that time, however, it is claimed there probably has been

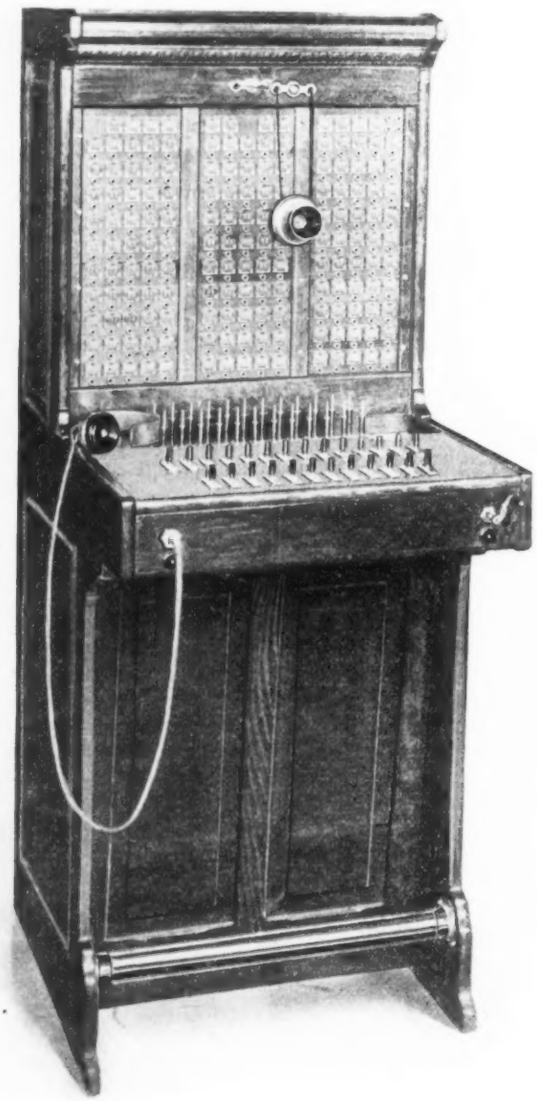


FIG. 1. INTERNATIONAL EXPRESS SWITCHBOARD.

none that has embodied in the construction of its parts as many new features and marked improvements as the mechanical self-restoring drop (Express) switchboard recently put on the market by the International Telephone Manufacturing Company of Chicago.

The International Express board, a front view of which is shown in Fig. 1, is designed both electrically and mechanically along the most practicable lines. The framework is made in sections for the accommodation of 100, 150 or 200 subscribers' lines to the operator's position. The section shown is arranged for 150 lines to the position. The cabinet is built of well-seasoned, quarter-sawed oak—the back of the cabinet is provided with two hinged panel doors. The key-shelf is hinged so it may be raised to inspect the ringing and listening keys. This shelf is built of five layers of wood, with the two outer and center layers running lengthwise of the shelf and the other two layers running cross-wise, and

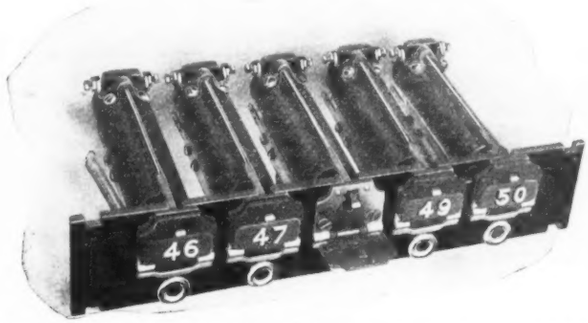


FIG. 2. INTERNATIONAL COMBINED DROPS AND JACKS.

all securely glued together. The plug-board is neatly covered with heavy belt leather, stained to match the woodwork. At the front of the board, at the bottom, is placed a brass foot-rail of neat and substantial design.

The combined drops and jacks are mounted in strips of five on strong steel plates, as shown in Fig. 2. These steel supporting strips, with the drops, are mounted in the boards on a strongly built steel frame, securely fastened into the front of the board. The drop mounting strips are fastened to the steel rack or frame from the front of the board by heavy machine screws, placed underneath the stile strips.

Fig. 3 shows a side view of the drop and jack. The drop shutter is mounted on the front of the steel mounting-plate. The back-plate of the shutter is constructed at the bottom with a part of its stock formed out to provide a positive stop

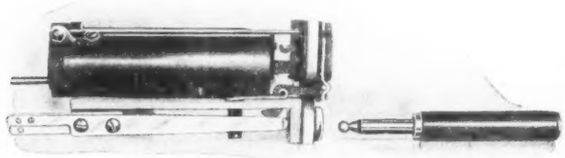


FIG. 3. SIDE VIEW INTERNATIONAL DROP AND JACK.

for the shutter to prevent its falling too far and covering the jack.

The drop coil is of the tubular style. The coil is mounted on the base of the jack and is fastened with two screws The springs of the jack are of the best grade of German silver and are long and of very heavy stock. The springs near the front end rest against an insulated stop-pin which enables giving them a heavy tension even at their nominal position and insures a good, positive plug-connection at all times, without bending the springs but a very small amount. This construction enables the use of a regular multiple switchboard plug with absolute safety. The springs are

mounted on the brass base and are firmly clamped with mica insulation by heavy machine screws. The combined drop and jack are mounted on the steel mounting-strip by screwing the ferrule of the jack through the mounting-strip from the front of the board into the end piece of the brass jack base. This construction enable readily removing a drop and jack from the front of the board without disturbing the shutters. The iron coil shell is provided with a guide-pin to form a guide to insure placing the coil in its proper position at all times and to also prevent the drop being improperly mounted or coming out of place. The drops and jacks are perfectly insulated from the frame by a heavy mica sheet, covering the back of the mounting strip and with hard rubber bushings for the jack ferrules and binding screws. This gives the drop perfect insulation from each other and absolutely insures against induction and cross-talk. The shutter restoring trigger is mounted on the base of the jack and is supported on a heavy German silver compensating spring. This compensating spring absolutely prevents the plug, when inserted, to fail to restore the shutter even after the restoring trigger and plugs become worn from heavy continued usage.

The night-bell spring is mounted immediately above the restoring trigger and is brought in connection with the night bell contact when the shutter falls and the restoring trigger is raised. The night-bell contacts for each strip of five drops are made of one solid brass strip, properly punched and formed and lead to the end of the mounting-strips at which point connection is made by a small spiral spring to the common night bell strip, which is mounted in the rear of the board between the banks of drops, and which is provided with small hooks so that the night-bell circuit of each strip of drops may be readily disconnected for testing. This construction makes a very substantial and reliable night-bell circuit and enables conveniently making tests.

These boards are provided with the well-known International key, having all of the terminals of the key at one end so that they may be wired with one key-cable and leave all of the springs and contact points open and free for inspection.

When sent out, these boards are completely wired and furnished with the proper cable for leading to distributing board.

The equipment, as a whole, is simple and has every detailed part made of the very best material and constructed with special tools and dies so that all like parts are uniform in size, shape and form to enable assembling the complete equipment without filing any of the parts, which insures accuracy of assembling and permanency of adjustment.

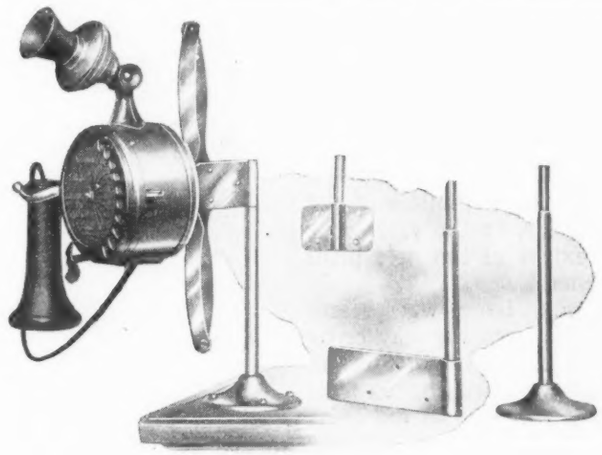
A NEW HAND BOOK OF DIAGRAMS.

"Modern Wiring Diagrams and Descriptions" is the title of a new handbook of practical diagrams and information for electrical workers by Henry C. Horstmann and Victor H. Tousley. It contains 160 pages and over 200 illustrations; is full leather binding, with round corners and red edges. Size 4x6 inches. This little volume ought to have a large and immediate sale. It is not needlessly burdened with pictures of apparatus with which all electrical workers are familiar. It has no padding; it is all meat. There are no elementary rules. It starts from the first cover to show you and tell you about diagrams, presuming that you already have some knowledge of the business. There are twelve diagrams of call and alarm circuits; twenty-eight meter circuits; twenty-one motor circuits; seven primary battery circuits; seven telephone circuits; and innumerable others; with wiring tables and illustrations. It describes the Wheatstone bridge; tells how to test circuits and batteries. It is a practical pocket companion for electrical workers in general. The publishers assert that money will be cheerfully refunded if the book is not all that is claimed for it. The price is fixed at $1.50.

AUTOMATIC ADJUSTAPHONE.

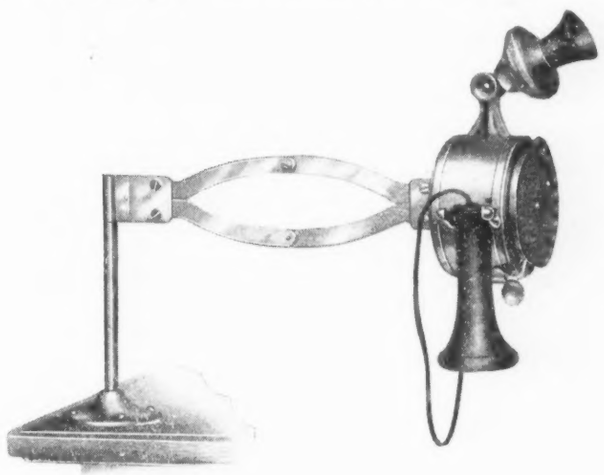
The Chicago Writing Machine Company, manufacturer of the Adjustaphone, has arranged with the Automatic Electric Company to apply the Adjustaphone principle to the desk telephones manufactured by the latter company.

The accompanying illustrations show the Adjustaphone



AUTOMATIC ADJUSTAPHONE.

principle applied to the automatic telephone. The combination makes an exceedingly neat instrument, and is one which will undoubtedly appeal to subscribers as well as to managers of telephone exchanges. The Illinois Telephone and Telegraph Company, now installing an automatic exchange



AUTOMATIC ADJUSTAPHONE.

in Chicago, will furnish this type of instrument on all orders for desk sets hereafter.

That the Adjustaphone principle is now well known is evinced by the many inquiries received from all parts of the United States, Canada and foreign countries, and it is evident that the telephone fraternity regard the Adjustaphone as a practical, economical and efficient instrument. To those of our readers who are not already familiar with the Adjustaphone, The Chicago Writing Machine Company, 87 Wendell St., Chicago, will be glad to send its catalogue and other information regarding this unique instrument. While the company is working overtime to fill orders it will be glad to hear from all who are interested, and to give all orders prompt and careful attention.

W. C. Sterling & Son, Monroe, Mich.

A RECORD OF TWENTY-FIVE YEARS IN THE CEDAR INDUSTRY

It is probable that the pole will long remain one of the most prominent and typical features of electrical development, and that the various public services, such as the trolley, the telephone, the electric light and the telegraph will long be insatiable in their remands for a support of aerial wires. In fact, even the wireless telegraph seems to run more strongly to poles, and big ones at that, than any of the precedent arts. The result is that one of the large businesses closely allied to electrical applications is that of furnishing poles, and no one who has missed the chance to see them can form an accurate idea of the magnitude of the pole yards, or the vast scope and extent of the pole plant in general.

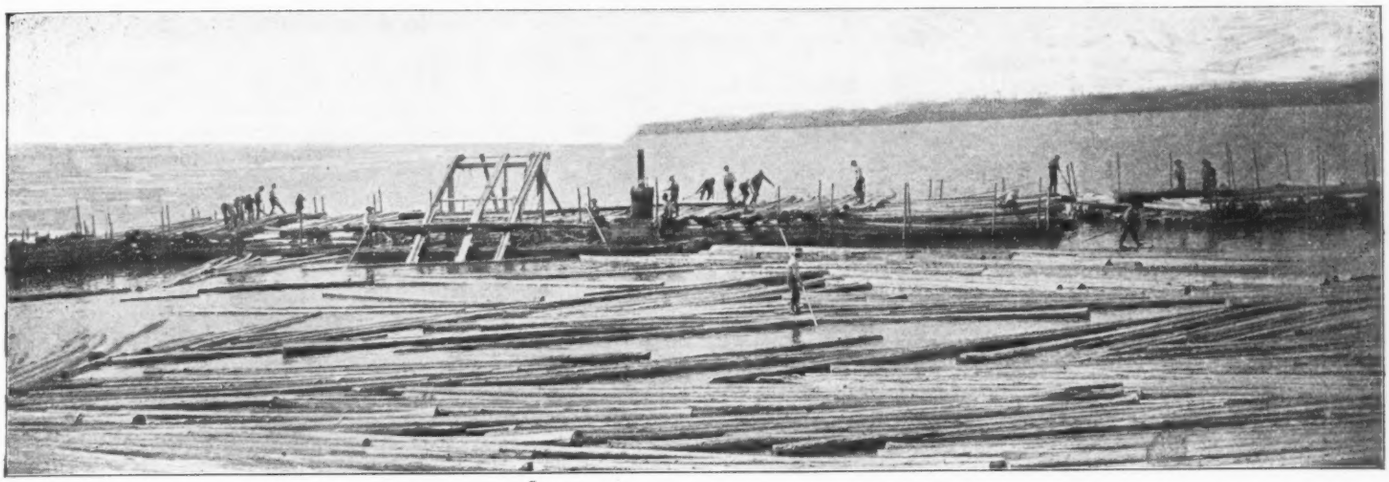
In this issue we present some views of the way cedar is handled by W. C. Sterling & Son, who are now in their twenty-fifth year of the cedar business. A quarter of a century is a long time to handle poles, and in that time they have built up a large business on a good financial basis. They have some customers to whom they have furnished poles all this time without missing a year.

W. C. Sterling began getting out cedar and selling to the trade in 1880, and has gradually built up a large business. The firm's principal yard is located at Omer, Mich., on the Detroit & Milwaukee Railway. They have 50,000 to 100,000 poles sorted and piled at this yard all the time ready for quick shipment. They have yards also on the Perre-Marquette Railway, Michigan Central Railway, and a small yard at Monroe to fill "hurry up" orders. Their accumulating yards are all through Michigan and they are now starting a large yard at Bay City. There is probably no better known firm in the northern part of the lower peninsula of Michigan. They have an army of men working all along the different roads, getting out cedar, others going from one end of the railroad to the other picking up all cedar gotten out by small jobbers and owners. W. P Sterling is the firm's superintendent, located at Alpena, Mich., who looks after their stock. All their contracts and sales are made through their Monroe office.

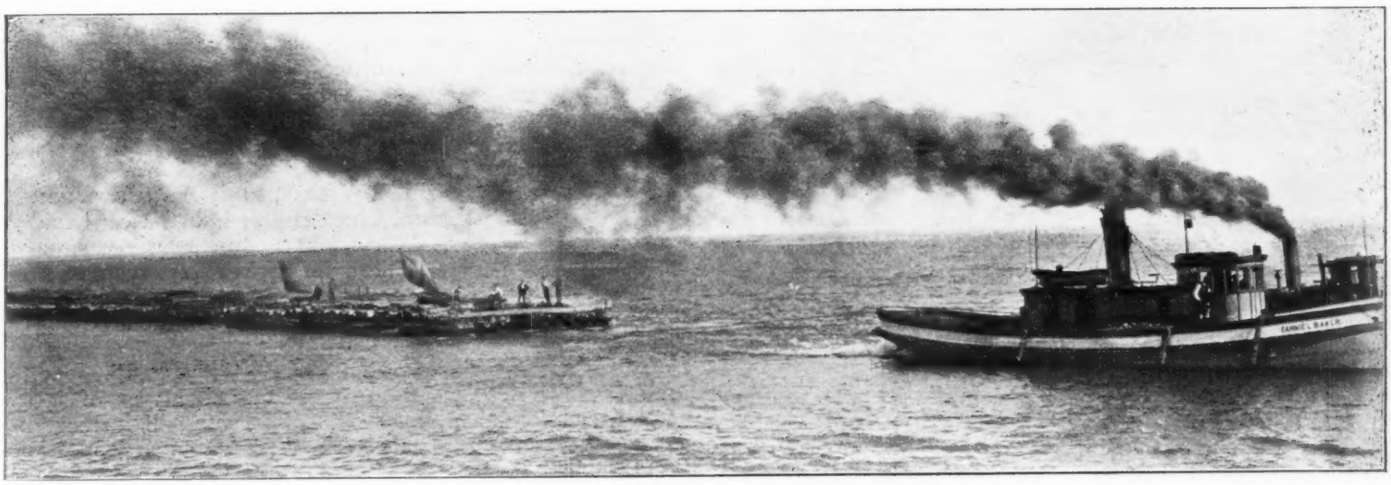
The company has just completed taking inventory and is making plans for the coming year's trade. Pole prices are exceedingly low now; but the outlook is for considerably higher prices. There is not a legitimate profit in the business at the present prices Cedar costs more each year to get out because it has to be handled more and producers have to go further to secure it. Rates are continually being raised and cedar stumpage getting scarcer and more valuable. It is only a question of a few years when cedar stumpage will all be bought up by the cedarmen and rapidly cut. There is nothing to take the place of cedar for a pole. It is claimed to last longer, is lighter, and very strong. Michigan cedar is said to last longer than Idaho and so-called Southern cedar. This firm has just had a report from one of the largest cedar pole consumers and they report that Michigan cedar poles by actual tests have by a big margin outlasted Idaho and other cedars.

In the illustrations herewith some of the methods of handling cedar are shown. Cedar camps are made in the heart of a cedar forest. Here men work all through the winter cutting the timber and getting it ready for shipment to the large sorting yards at different points. The method of handling it upon the great lakes is shown in the illustrations.

W. C. STERLING & SON'S CEDAR IN THE RIVER.

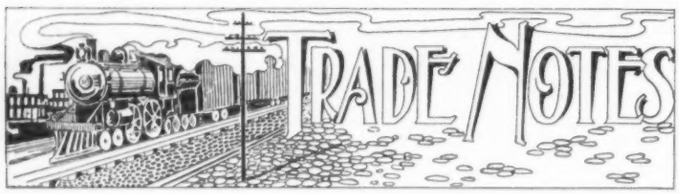


W. C. STERLING & SON'S CEDAR RAFT IN LAKE HURON.



W. C. STERLING & SON'S CEDAR RAFT BEING TOWED INTO HARBOR.

W. C. STERLING & SON'S YARD SHOWING SORTED AND UNSORTED CEDARS.



MORRIS ELECTRIC COMPANY, Wilmington, Delaware, will be glad to send, upon request, samples of the Morris hard fiber cleat, which is especially adapted for telephone wiring.

WALTER E. SCOFIELD, manufacturing agent, New York City, is sending out a leaflet illustrative and descriptive of the Hughes adjustable telephone bracket. This leaflet will be sent on request.

THE CHICAGO FUSE WIRE AND MANUFACTURING COMPANY, New York, Buffalo and Chicago, is sending out its new catalogue No. 15, in which is listed a complete line of fuses. Catalogue will be sent on request.

THE ATWATER KENT MANUFACTURING WORKS, Philadelphia, Pa., is sending out a booklet in which is listed automatic volt-ammeters, voltmeters and ampere-meters. This catalogue will be sent on request.

F. L. SHAFER COMPANY, 269 Dearborn street, Chicago, is selling agent for the Perfect telephone disenfector, which is claimed to possess many meritorious features. The selling agents solicit correspondence from interested parties.

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester and Chicago, has recently contracted with Leach & McArthur, Chillicothe, Mo., for a 1,000-line visual signal generator call switchboard with 800 lines installed.

G. M. GEST, Cincinnati, Ohio, the conduit contractor, etc., has issued a large and handsome calendar for 1904, the illustration on which is a double manhole built by him for the Louisville, Ky., Railway Company. The background card is a Pompeiian red.

THE ELECTRIC APPLIANCE COMPANY, Chicago, Ill., will be pleased to send a descriptive circular relating to its latest ideas in telephones of all kinds. These circulars also give full details of the new Dinsmore automatic telephone for intercommunicating work.

YESBERA MANUFACTURING COMPANY, Toledo, Ohio, has recently issued an attractive folder illustrating and describing the company's complete line of telephone booths. This folder and other advertising matter and prices will be sent by the company upon request.

AMERICAN MINIATURE AND DECORATIVE LAMP COMPANY, INC., New York and Chicago, is sending to the trade a folder describing Standard tipless lamps. The booklet is fully illustrated and may be had by application in writing to its New York or Chicago office.

S. H. COUCH COMPANY, Boston, Mass., will send upon request full information concerning the company's number 50 style of compact telephone. This instrument is made in both series and bridging types and is meeting with favor among all classes of telephone users.

THE BAIRD TIME STAMP which is advertised in this issue of TELEPHONY is meeting with great favor among telephone companies as it is a very strong, durable and reliable instrument at a moderate price. The simplicity of construction enables the manufacturers to sell it at a much lower price than instruments of this character have heretofore been placed on the market and they absolutely guarantee it to give satisfaction. It is made by the Baird Manufacturing Company, Chicago.

THE SWEDISH-AMERICAN TELEPHONE COMPANY, Chicago, has recently issued an attractive girl calender which is one of the finest specimens of its kind we have seen. The calendar will be sent free to anyone desiring it, provided this publication is mentioned when writing.

MANHATTAN ELECTRICAL SUPPLY COMPANY, New York and Chicago, is mailing to those interested trade price list "C" applying to catalogue 14. Those desiring both catalogue and price list may obtain same by addressing the company at its New York or Chicago offices.

C.-A. MANUFACTURING COMPANY, Austin, Texas, is mailing a booklet devoted to the art of wood preservation which is of considerable interest. A two-page illustration of the chemical works at Manheim, Germany, where C.-A. wood preserver is manufactured, is shown. The book will be mailed postpaid upon request.

ILLINOIS ELECTRIC COMPANY, Chicago, has printed ready for distribution an interesting book on the French voltmeters, ammeters, volt-ammeters and pole indicators, which will be sent to any one interested upon request. The company will be glad to send its complete line of advertising literature to any one desiring it.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester and Chicago, has issued a card folder devoted to semi-portable telephones for steam, electric and inter-urban railways. The folder is unique and contains cuts of late apparatus, together with a reprint from the *Street Railway Journal* on portable car telephones.

THE CENTRAL ELECTRIC COMPANY, Chicago, Ill., reports a very gratifying business for the outgoing year of 1903, and asserts its belief that 1904 will witness still further improvement and development of its already immense business. The company states that it will continue to push with vigor the same specialties with which its name is already so well identified.

STANDARD TELEPHONE AND ELECTRIC COMPANY of Madison, Wis., has placed its new series and bridging ringers on the market. They are very efficient and are meeting with very satisfactory sales. The trade is supplied with the new types of ringers as well as their being used on all Standard telephones. A new desk telephone and switchboard will also be ready shortly.

EWING-MERKLE ELECTRIC COMPANY, St. Louis, Mo., is issuing a number of attractive advertising folders, cards and booklets illustrating and describing the company's complete line of telephone and electrical supplies. The latest folder is entitled "Yoking Our Interests." The entire set will be mailed by the company upon request, and make most interesting reading.

THE AMERICAN STEEL AND WIRE COMPANY, New York, Chicago, Worcester, Denver and San Francisco, U. S. A., is sending out its catalogue which contains a list of the company's products such as steel plates and sheets, telegraph and telephone wires, turned shafting, standard wire nails, woven wire fencing, electrical wires and cables, etc. The company will be pleased to send catalogue on request.

STANDARD TELEPHONE AND ELECTRIC COMPANY, of Madison, Wis., has recently secured an order for a complete exchange and line equipment for 1,000 lines at Guyaquil, Ecuador, South America. It has also lately shipped an order

of sixty telephones into Guatemala, to be placed in use on a large plantation. Present and prospective orders indicate that the spring business of the Standard will be largely in excess over that of 1903.

THE F. BISSELL COMPANY, 226-230 Huron street, Toledo, Ohio, is distributing a number of bulletins for use in its perpetual calendar. These bulletins are descriptive of telephone supplies and specifications, as well as electrical supplies of all description. Any one who has started this perpetual catalogue should write for these bulletins immediately and bring it up to date. Otherwise the company will be pleased to supply any one desiring it with a complete catalogue.

THE S. H. COUCH COMPANY, 156 Pearl street, Boston, Mass., manufacturer of telephone specialties, in a new folder describes the "Work Well" telephones. This is an intercommunicating apparatus, and is equipped with two and one-half inch gong, self-contained hook switch, three-point push-button switch, induction coil, twenty-four-inch cord, one-piece binding-posts, solid double-pole receiver, button type transmitter, with all connections soldered. This folder will be sent upon request.

THE CENTRAL TELEPHONE AND ELECTRIC COMPANY, 909 Market street, St. Louis, Mo., will be pleased to send its catalogue No. 18 to any one interested. This describes and illustrates telephone instruments and switchboards. In addition to the complete listing and description of telephone apparatus manufactured by this company, there is shown a series of the exhibition buildings of the St. Louis Exposition. This is a valuable souvenir, and will, no doubt, be greatly appreciated by all who receive it.

THE STUART-HOWLAND COMPANY, of Boston, Mass., is proud of its growth. Starting in a modest way four years ago, it has developed one of the largest supply businesses in New England. In order to impress upon the users of electrical supplies the present size and importance of the concern it has issued a tasteful calendar, with a half-tone illustration on it of its present quarters. The stock which this enterprising company carries of all kinds of supplies makes it a most convenient house to do business with in its section of the country.

THE ELECTRIC APPLIANCE COMPANY, Chicago, held its annual banquet on January 9. At this time a series of papers was read by the salesmen and heads of departments, dealing with origin, care and shipment of an order. The taking and shipping of an order would seem a simple matter. As developed by the papers read, it becomes evident that there is a large amount of care, knowledge and thought necessary to properly handle an order to the satisfaction of an up-to-date supply house and of a wide-awake customer. The Electric Appliance Company has surrounded itself with a splendid organization and a bright set of men, and is rapidly forging ahead in modern business ways.

THE SWEDISH-AMERICAN TELEPHONE COMPANY, Chicago, has recently received orders for complete equipments from the following named telephone organizations: Byhalia Telephone Company, Byhalia, Miss.; Graettinger Telephone Company, Graettinger, Iowa; Farmers' Telephone Company, Bladen, Nebr.; Miller & Mt. Vernon Telephone Company, Miller, Mo.; Peninsular Telephone Company, Euseneda, Mexico; Tucumcari Telephone Company, Tucumcari, N. M.; Interstate Telephone Company, operating exchanges at Epsom, Odon, Montgomery and Elnora, Indiana. The Swedish-American Company is mailing out its new catalogues and if any one has been overlooked in the general distribution, they are requested to notify the above named company and they will be furnished with copy of same, which contains a great deal of value to telephone men.

F. B. BADT & COMPANY, 1504 Monadnock Block, Chicago, western agents for the Weston Electrical Instrument Company, Waverly Park, Newark, N. J., distributed at the recent convention of the Interstate Independent Telephone Association a handy reference manual for engineers. This book has been compiled by Charles E. Ferris, B. S., professor of mechanical engineering at the University of Tennessee, and printed by the University Press, Knoxville, Tenn. The booklet contains a mine of information for busy men and engineers, and is one of the most useful souvenirs which has even been distributed. Those who desire a copy may obtain one free by addressing the company, and mentioning this publication.

W. J. MURDOCK & COMPANY, Chelsea (Boston), Mass., are sending out a booklet devoted to the Murdock "Solid" receivers. In speaking of the receivers the company says: "Telephone manufacturers have long desired a receiver that could endure the rough treatment generally given this particular instrument. In the familiar hollow shell instrument, they suffered constantly from the loosening of the parts, from the cracking of the case, and worse than all from frequent changes of position of the diaphragm with relation to the pole pieces. This variation of distances made it impossible to secure the best results out of the receivers and was a constant source of complaint from the users. In the "Solid" receivers these defects have been remedied effectively. The metal parts of the receiver are molded solidly into the case, making the instrument not only practically unbreakable but giving an adjustment that is absolutely unchangeable. The "Solid" receivers are made in three styles. The first style "C," a bi-polar pony receiver, with strong binding posts on the outside. In the second, style "E," the binding posts are dispensed with, and the connections are made with the cord, by small screws, which are covered by a cap that forms the end of the receiver. In this style of receiver it is impossible to receive a shock while using it, as no metal parts are exposed. The "Solid" receiver made up in watch-case form, is also of the bi-polar type, having the cord connections on the inside."

CEDAR POLE OUTLOOK.

Usually the cedar pole business does not start up until about the first of March. The manager looks over his lines, gets his franchises, permits, etc., and very probably puts in his orders for wire, telephone cable, etc. The one thing that is liable to escape attention is the buying poles.

If he could realize the much greater satisfaction of getting his poles shipped even a few weeks ahead of the time that he needs them, the pole business would be much more evenly distributed and every one would be happy.

As it is, the bulk of the business is crowded into the time when all kinds of coarse freight are just starting to move, and every one wants cars at once. The consequences are well known; every one has to wait.

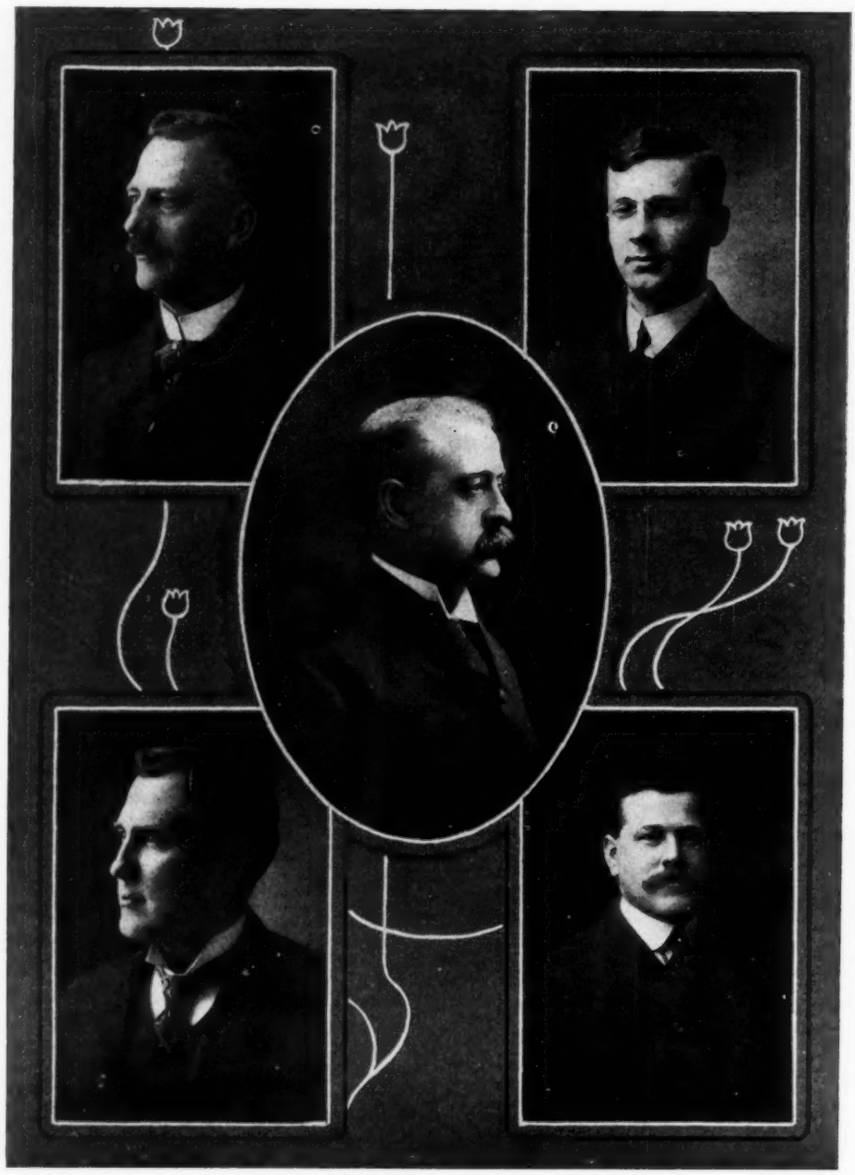
However, Maltby Lumber Company of Bay City, Mich., report that trade is already improving and if things keep up it will have done as much business before March 1 as it usually does by the 15th of April. Apparently its customers are taking a step in the right direction. The whole affair is something like Christmas shopping—while the quality of the stock shipped does not vary, "first come is first served." The loss by waiting for a car of poles hung up in a freight blockade will pay a year or two interest on the money invested in the purchase of poles now instead of later.

I would very much dislike to be without TELEPHONY and think all who are connected with an exchange in an official capacity should have it.—D. H. Palmenter.

The Dean Electric Company, Elyria, Ohio

A New Telephone Manufacturing Concern

The Dean Electric Company has been incorporated under the laws of the state of Ohio for the manufacturing of telephone equipment. The officers of the new company are Samuel B. Rawson, president; William W. Dean, vice-president and chief engineer; T. M. Brush, treasurer; A. E. Barker, secretary and general manager. These gentlemen, with Mr. J. H. Griswold, are the incorporators. Messrs. Rawson, Griswold and Brush are well known in the Independent telephone field, and are the founders and builders of a large number of exchanges in the states of New York and Ohio, among which are Albany, Schenectady, Cohoes, Niagara Falls and Elyria. Mr. A. E. Barker has been in the Independent telephone business for a number of years, being one of the engineers and builders of the Detroit and New Orleans exchanges. In addition to this experience he has been for several years with the Kellogg Switchboard and Supply Company, Chicago, Ill., in an engineering capacity, and finally had entire charge of the sales end of the business, with the title of sales manager. Mr. Dean has been connected with the telephone business for about twenty years and has been with the following companies: The Bell Telephone Company of Missouri, at St. Louis; the Union Telefonica Company, Buenos Ayres, South America; the American Bell Telephone Company of Boston; the Western Electric Company, Chicago, and the Kellogg Switchboard and Supply Company of the same city. The capital stock of the new company is $300,000.



S. B. Rawson, President. A. E. Barker, Secretary.
W. W. Dean, Vice President.
T. M. Brush, Treasurer. T. H. Griswold.

PERSONNEL OF THE DEAN ELECTRIC COMPANY.

In speaking of the future of the new company A. E. Barker, the secretary, said to a representative of TELEPHONY:

"It is our intention to manufacture everything necessary for the construction and equipment of a modern telephone exchange. Our engineering department will be under the personal supervision of W. W. Dean, who, in addition to being vice-president, will be chief engineer of the company. Among his assistants will be Ray H. Manson and S. A. Beyland, who have resigned with the Kellogg Switchboard and Supply Company to join our forces. W. E. Harkness, formerly chief engineer of the Consolidated Fire Alarm Company of New York city, will be our shop superintendent.

"We are building a new factory in the eastern part of Elyria, for which purpose we have secured a building site of ten acres located on the main line of the Lake Shore & Michigan Southern railway. The present buildings will consist of a main factory building 360x60 feet and two stories in height, with boiler house, blacksmith shop and woodworking shop in outlying buildings. The factory will be modern in every respect.

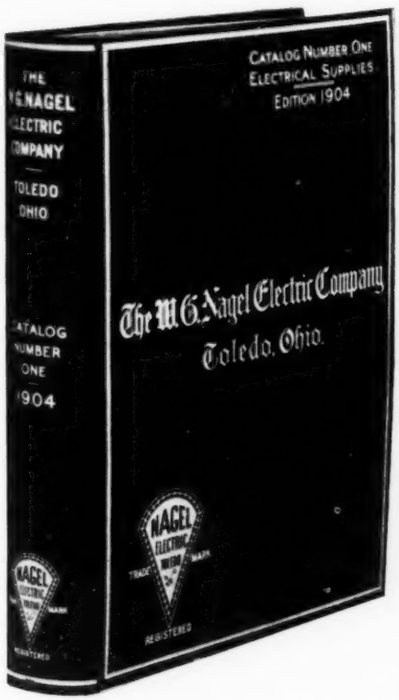
"The machinery will all be new and of the very latest type. The power equipment will consist of Westinghouse gas engines, direct connected to 75 K. W. generators, and each department will be run with individual motors connected with the power plant, which will have a high-pressure steam boiler for heating and reserve power purposes. The buildings are of Canton shale brick with standard mill construction.

"We already have contracts which will warrant us going into the common battery multiple switchboard end of the business on a very large scale at the very start. Of course, right in connection with this we will take on a complete line of magneto apparatus. We expect to be able to turn out some of our product by the middle of April."

TELEPHONY is enabled to present the portraits of Messrs. Dean, Barker, Rawson, Brush and Griswold, all of whom are well known in the Independent field. The personnel of the company is representative and the new concern will be a material factor in the telephone manufacturing industry.

NEW CATALOGUE.

The W. G. Nagel Electric Company, Toledo, Ohio, has just received from the press its new 1904 catalogue, containing over 900 pages of descriptive and illustrated printing of electrical supplies. This catalogue is of especial interest to Independent telephone companies. No pains or expense has been spared to make this book the most complete and up-to-date in existence. The W. G. Nagel Electric Company has for a number of years been foremost in the field of telephone supplies. This book contains complete information in supplies from and including the switchboard to the subscriber's telephone. The catalogue contains thirty-six pages of very useful data and information of value to electrical engineers as well as to telephone men.



It will be remembered also that this company is the manufacturer of "Ready" all-iron payout reels, the demand for which has grown to such an extent that it appears only a question of a short time until the old-fashioned wood reels will be entirely replaced by this new line of reels.

A special offer is being made to those who have not yet used "Ready" payout reels, as follows: On a trial order for one "Ready" payout reel freight charges will be paid on the reel and catalogue will be sent by express prepaid.

Bulletins and prices of "Ready" payout reels will be mailed on application.

MEASURED SERVICE ON A STRONG FOUNDATION.

In view of the interest which has been shown of late in the matter of measured service, it is important to learn that Harold D. Stroud, who is one of the authorities on measured service, has become associated with the Controller Company of America as its engineer and general manager. Mr. Stroud was formerly with the Chicago Telephone Company and was a considerable factor in building up that company's measured service business. He is said to be the first man to come out with a coin controller for telephones as well as a meter for handling measured service traffic, which does not to any extent decrease the operating speed.

His exhibit at the recent Interstate convention attracted marked attention among the prominent exchange managers who are looking for any practical device which will enable them to increase the rates for service and to eliminate the use of the instruments by dead-heads. The Controller Company of America is a St. Louis concern with offices in that city and Chicago and backed by such men as H. A. Forman, president Fourth National Bank, St. Louis; Jno. F. Shepley, president Union Trust Company, St. Louis; B. F. Edwards, treasurer National Bank of Commerce, St. Louis; Jno. A. Lewis, treasurer Continental National Bank, St. Louis; N. A. McMillan, treasurer Union Trust Company, St. Louis; Walker Hill, president American Exchange Bank, St. Louis; P. T. Barry, Englewood National Bank, Chicago; R. J. Gunning, president Gunning System, Chicago; C. D. Garnett, Garnett & Allen Paper Company, St. Louis; Geo. D. Allen, Garnett & Allen Paper Company, St Louis; E. G. Lewis, president Mail Order Publishing Company, St. Louis. The officers of the company are: H. A. Forman, president; John F. Shepley, vice-president; John A. Lewis, secretary; E. G. Lewis, secretary, and Harold D. Stroud, engineer and general manager. The capital of the company is $200,000, fully paid, which it is said will be increased. With this financial foundation and the best devices known with which to carry out its plans, the company's success seems assured, meaning that the Independents will have a chance to give the Bell a few lessons in measured service.

The Stroud coin controller is a product of about four years' study and experiment, not along uncertain lines, but where its inventor could see the weak points in the machines in use by the Bell company, and the Independent companies who adopt this machine will have the satisfaction of knowing that the Bell cannot hope to compete with them on measured service.

The plans of the Controller Company of America are to handle the pay-station business for the telephone companies, and to do this will furnish the collecting and metering devices separate or complete with a telephone constructed entirely of metal mounted on a pressed steel back-board, the whole set taking up a wall space of about nine by twelve inches. These outfits are to be furnished to meet every demand of modern exchange practice, ecntral energy or magneto systems, for individual or party lines with selective ringing. The company's executive offices are at St. Louis, the business offices are at 707 Royal Insurance Building, Chicago, where all business will be handled until its new building situated near the World's Fair ground on University Heights in St. Louis is complete, which will be about June 1, 1904.

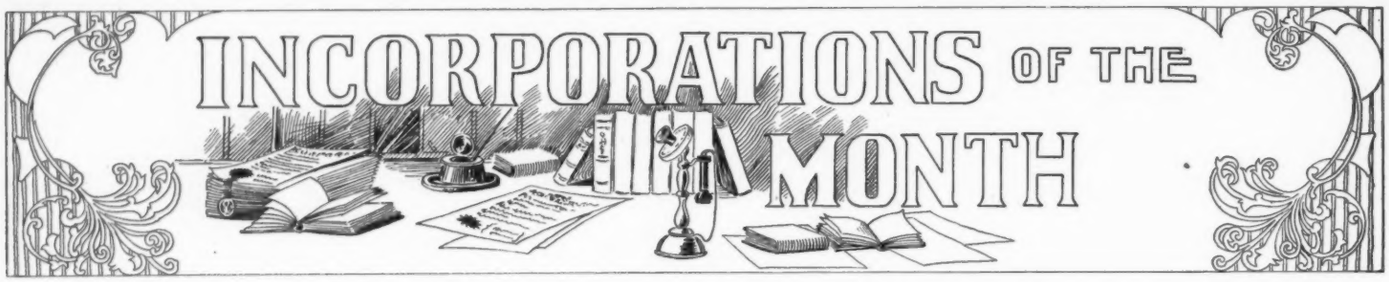
BULLETIN NO. B-22.

"Bulletin No. B-22" is the rather unpretentious title for a new catalogue recently issued from the advertising department of the North Electric Company, Cleveland. TELEPHONY has sung the praises for many clever telephone catalogues in time past, but it rarely has an opportunity to examine a more perfect pamphlet than the new North bulletin, which has the additional title of "Modern Methods." In argument this catalogue says in part:

> History shows that all industries involving the use of mechanical appliances have gone through a period of non-stability awaiting not only a crystallization of best business methods, but also the evolution of their apparatus, until time and experience bring out the ultimate types best adapted for performing the functions required. The telephone business has been no exception. In the early days the purchaser not only groped his way through the intricacies of exchange management and traffic, but even knew little about the electrical and mechanical requirements of his apparatus. He usually took whatever the energetic salesman suggested. Sometimes, however, he insisted on using even a second quality at a time when the best was crude. Shrewd observers know that the day of scientific and careful management is at hand for him who would succeed. It has been demonstrated that, like other industries, every possible step must be taken to legitimately reduce to the minimum the operating and maintenance cost of the telephone property and increase the earning capacity.

It would seem that this argument is as strictly up to date as the many other departments of the North establishment. "North for quality" has become an axiom with a large and ever-increasing patronage. Bulletin No. B-22 is typical of North quality, being a magnificent forerunner of the apparatus itself. Its argument is also of that quality that has built the reputation for a factory that enjoys a marked degree of deserved prosperity.

TELEPHONY is good enough for me.—J. A. Steininger.



Home Telephone Company, Corfu, N. Y.

Quincy Automatic Telephone Company, Quincy, Ill.

Pomeroy Mutual Telephone Company, Pomeroy, Ia.

Frankenfeld Farmers' Telephone Company, Havana, Ill.

Cumberland Gap Telephone Company, Cumberland, Tenn.

La Crosse Interurban Telephone Company, La Crosse, Wis.

Denver Mutual Telephone Company, Denver, Ind., organized.

Farmers' Mutual Telephone Company, Detroit, Kan., organized.

Home Telephone Company, Hollandsburg, Ohio. Capital stock, $2,000.

Newport Telephone Company, Newport, N. H. Capital stock, $2,000.

Kirksville Telephone Company, Kirksville, Ky. Capital stock, $7,500.

Beaver Valley Telephone Company, Rochester, Pa. Capital stock, $100,000.

Cherryvale Mutual Telephone Company, Cherryvale, Ind. Capital stock, $350.

Spinks' Corner Telephone Company, Bainbridge, Mich. Capital stock, $5,000.

Pleasant Plain Telephone Company, Pleasant Plain, Ia. Capital stock, $10,000.

Neighbor State Telephone Company, Comstock, Minn. Capital stock, $25,000.

De Funiak Springs Telephone Company, De Funiak, Fla. Capital stock, $9,000.

Mississippi Central Telephone Company, Louisville, Miss. Capital stock, $10,000.

Blackduck Electric and Telephone Company, Blackduck, Minn. Capital stock, $25,000.

Rock Creek Local Telephone Company, Jefferson, Ohio, organized. W. W. Weise, president.

Northeastern Rural Telephone Company. Capital stock, $1,000. Incorporators, J. E. Baker, L. H. Ayer, Jr.

American Exchange Telegraph, Telephone and Money Order Company, Cumberland, Ind. Capital stock, $10,000.

Fruitvale Mutual Telephone Company, Fruitvale, Calif. Capital stock, $1,000. Incorporators, Lee Hall and others.

Oblong Telephone Company, Oblong, Ill. Capital stock, $6,000. Incorporators, L. T. Shire, F. P. Willard, Zech Wirt.

Farmers' Telephone Company, Union Hill, Ill. Capital stock, $2,500. Incorporators, Albert Stehr and C. J. Ruder.

Ohio Valley Telephone Company, Proctorville, Ohio. Capital stock, $2,000. Incorporators, H. P. Gerlich and others.

Farmers' Mutual Telephone Company, Birmingham, Ia. Capital stock, $9,000. Incorporators, Geo. W. Morrell and others.

Collinwood Farmers' Telephone Company, Dassel, Minn., organized. President, Chas. Hoglund; secretary, John Engquist.

Independent Telephone Company, Le Mars, Ia. Capital stock, $25,000. A. C. Colledge, president; I. S. Mahan, secretary.

Medora Telephone Company, Medora, Ill. Capital stock, $10,000. Incorporators, John Payne, Oliver Pirwin, William J. Bell.

Grafton Telephone Company, Grafton, Wis. Capital stock, $4,000. Incorporators, John G. Buch, F. C. Mintzlaff, F. W. Mintzlaff.

Temple Telephone Company, Temple, Tex. Capital stock, $5,000. Incorporators, L. H. Henseley, D. S. Tandy, B. V. Loosemore.

Lawton Telephone Company, Sloan, Ia., organized. President, J. A. Smith; vice-president, A. Boline; secretary, Dr. C. M. Wray.

Finchford Mutual Telephone Company, Finchford, Ia. Capital stock, $50,000. President, W. W. Plantz; secretary, C. A. Evenson.

Readstown Telephone Company, Readstown, Wis. Capital stock, $5,000. Incorporators, F. M. Groves, G. W. Heinke, C. W. Reeve.

Masonville Telephone Company, Masonville, N. Y. Capital stock, $3,500. Incorporators, D. E. Smith, W. E. Bogart, F. L. Ostrander.

Beekmantown Telephone Company, Beekmantown, N. Y. Capital stock, $1,000. Directors, David Chellis, George Dloria, W. P. Walker.

Montour Telephone Company, Pittsburg, Pa. Capital stock, $10,000. Directors, W. R. Woodford, F. J. Lemoyne, G. W. Schleuderburg.

Dunlap and Alta Telephone Company, Dunlap, Ill., organized. Walter Allen, president; W. D. C. Threshie, secretary and treasurer.

Citizens' Mutual Telephone Company, Jefferson, Ia. Capital stock, $9,900. Henry Hogg, president; J. A. Henderson, secretary.

Citizens' Telephone Company, Zionsville, Ind. Capital stock, $15,000. President, J. O. Hurst; secretary and treasurer, H. T. Gallimore.

Dunn County Telephone Company, Rodgeland, Wis. Capital stock, $10,000. Incorporators, M. L. Randall, A. L. Pongratz, J. R. Ferguson.

Germicide Telephone Attachment Company, Riverside, Cal. President, Maurice Griffin; vice-president, Sylvester Sanker; secretary, Boyd Kith.

Hudson Mutual Telephone Company, Hudson, Ia. President, H. B. Eighmey; vice-president, Wm. Crownover; secretary and treasurer, W. J. Glenny.

Automatic Telephone Company, Midland, Tex. Capital stock, $10,000. Incorporators, G. J. Cowden, J. A. L. Camp, G. D. Elliott, E. P. Estes, I. T. Blair.

Byron Telephone Company, Byron, N. Y. Capital stock, $1,200. Directors, A. G. Steele, I. W. Whote, C. N. Green, H. C. Norton, F. C. and H. C. Walker.

York Telephone Company, Nelsonville, Ohio. Capital stock, $1,000. Incorporators, W. S. Wollett, J. G. Filley, J. W. Bennett, E. R. White, J. M. Bennett.

Union Telephone Company, Ingersoll, Okla. Capital stock, $10,000. Incorporators, A. W. Leonard, B. F. Blue, I. N. Bradley, K. B. McGinnis, M. M. Taylor.

Adams Telephone Company, Adams, Wis. Capital stock, $2,000. Incorporators, Christ Blailer, Reuben Garrison, John Barry, L. A. Rosslug, James Meenighan.

Clinton Telephone Company, Clinton, Mich., organized. President, H. H. Halladay; secretary, M. R. King; treasurer, O. H. King; manager, Geo. Wilson.

Pleasant Lake Telephone Company, Henrietta, Mich. Capital stock, $2,000. Directors, W. H. Coon, J. E. Bacon, Delavan Finch, Joseph R. Lowden, Arthur Nims.

Empire Electric Company, Toledo, Ohio. Capital stock, $20,000. Incorporators, F. F. Graves, Robert Tucker, William M. Godfrey, Charles E. Sumner, Charles Hartman.

Vineland Home Telephone Company, Vineland, N. J. Capital stock, $25,000. Incorporators, J. H. Dowler, Jr., Walter D. Wilson, Wm. E. Bates, J. Homer Lewis, H. Taylor.

Cumberland Gap Telephone Company, Cumberland Gap, Tenn. Capital stock, $10,000. Incorporators, G. W. Fortner, J. H. Quillen, A. B. Kesterson, J. W. Russell, J. Frank White.

Northern Nevada Telephone and Telegraph Company, Elko, Nevada. Capital stock, $10,000. Incorporators, John C. Taylor, H. H. Mallett, H. P. Irland, J. L. Winter, Altude Brothers, H. C. Irland.

Crab Orchard Telephone Company, Gallatin, Mich. Capital stock, $2,000. Incorporators, W. F. Hathaway, Hiram Burns, W. P. Heysey, E. E. Duffy, E. H. Cravens, M. A. Shipley, John O. Heaston, W. T. Roper and others.

Farmers' and Citizens' Telephone Company, Springfield, Minn. Capital stock, $25,000. Incorporators, J. S. Shroder, William G. Frank, A. G. Anderson, Ed J. Fernholf, C. A. Hintz, Albert Prahl Ernest, Alter Mott.

Winfield Home Telephone Company, West Winfield, N. Y. Capital stock, $5,000. Directors, Frederick C. Ward, Daniel J. McClure, Willard Bullion, George Caney, F. B. Callahan, George A. Armstrong, George S. Weeks.

American Car Telephone Company, Grand Rapids, Mich. Capital stock, $2,500,000. President and general manager, Theodore D. Morgan; vice-president, Frank W. Lyle; secretary and assistant general manager, L. Stiver.

West Fork and Sulphur Springs Telephone Company, West Fork, Ind. Capital stock, $2,000. Directors, George Dewitt, James Doolittle, A. E. Eaton, D. S. Miller, A. C. Eaton, George Schultz, George Doolittle, H. M. Esarey.